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PLAGUE-PROOF TOWN PLANNING IN BANGALORE, SOUTH INDIA

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J. H. STEPHENS, *Licentiate, R. I. B. A.*

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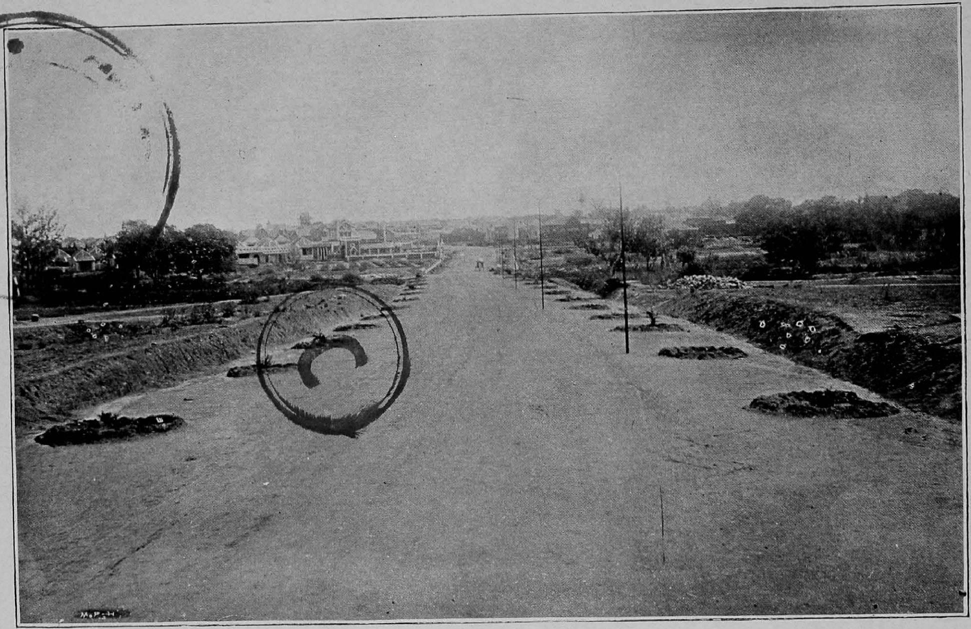

FRASER TOWN
Distant View of Town and its Principal Approach.

Plague-Proof Town Planning

IN

Bangalore, South India

BY

J. H. STEPHENS, *Licentiate, R.I.B.A.*,

Late Municipal Engineer to the Corporation of the Civil and Military Station of BANGALORE, South India

A brief description of the Plague and the Rules by which a new Town extension, "Fraser Town," was made Plague-Proof

MADRAS
METHODIST PUBLISHING HOUSE
1914

INTRODUCTORY NOTE

The writer was Municipal Engineer to the Bangalore Corporation from the first stages of the Plague to the middle of 1912. He was Engineer to the special Plague Department. Most of those fourteen years were devoted to the study of the conditions of the poorer Indian Sections of the town and to an attempt to improve them. Also he had ample opportunity of studying the plague in its native element, and can therefore, as one who knows, say about it that any permanent improvements to be complete should also aim at being PLAGUE-PROOF.

Before coming to Bangalore he was thirty-four years in the Public Works Department of the Government of Madras. For about twenty of these, he worked out in the Districts in floods and famines and in important District works. He thus acquired an intimate knowledge and acquaintance with the RURAL *population. After living amongst them so long, he knew personally their goodness and kindness, their simple wants and requirements and where improvements in their condition were most required.*

For fourteen years after this, he was employed in supervising the construction of the largest architectural and other works in the City of Madras, where he had personal contact with the INDIAN CRAFTSMAN. *The interior of the Madras Law Courts, decorated under his supervision, and the beautiful stained glass work is a sample of what that craftsmanship can do.*

Looking back with gratitude to God and a grateful appreciation of the help of half a century of pleasant contact with a kindly people, he has now tried to express in a weak way the things that appear to him to be for their best interests.

BANGALORE, S. INDIA, THE AUTHOR.
November, 1914.

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SECTION I

Condition of Bangalore at the First Great Outbreak of Plague

Pages 27 to 34

THE plague proof rules on which Fraser Town was built were learned by actual contact with the plague-infected in their own houses, in the plague-stricken localities.

2. Nearly every plague-infected house was examined and an attempt made to ascertain the cause of the plague in that house. Damp and stagnation of moisture on the soil it was found had nearly always something to do with the plague in that place.

3. The scenes of sorrow and grief witnessed in the plague-stricken localities human sympathy could not relieve.

4. The breach of a fundamental sanitary law brought retribution.

5. The severe plague regulations were harder on the poor than the plague itself.

6. Forcible segregation and its results.

7. Abolished as soon as England knew the suffering it was causing her Indian subjects.

8. Strike and desertion of sweepers and scavengers reduced Bangalore to a pitiably filthy condition.

9. Sir Donald Robertson speedily rectified matters.

10. Organised a separate Plague Department with Colonel Roa at its head and, amongst other things, imported English nurses.

11. A description of the English nurses and their great attention to the plague stricken.

12. Many sick were secreted, and others brought too late; but their last moments were soothed and comforted by these nurses.

13. The English nurses returned to England after the worst outbreak of plague was over.

14. The relations and friends of those helped will be pleased to know that all possible official honours were conferred on them as their work deserved this small recognition.

15. Colonel Roa's energetic action in arranging camping grounds outside the towns, and in making the peoples' stay there a pleasant picnic.

16. He cleaned and disinfected their houses while the people were away, saved many precious lives, and lightened the sorrows of others by his kindly actions.

17. Inoculation was pushed vigorously in the later stages of the plague and made popular to the poor by the payment of batta.

18. When caste people saw the effect of inoculation on the non-caste they also sought to be inoculated.

19. At best inoculation is only a temporary protection and did not destroy the root cause of the plague.

20. It was found that the plague servants were specially liable to contract the disease.

21. The wearing of heavy boots was a good protection.

22. Shows that the plague germ is on the ground or immediately above it.

23. Government of India kindly give financial help, and the Plague Department and the Plague Hospital still continue on a small scale. There are some very fine open sites in Bangalore, and a permanent isolation hospital should have a better location, than the very insanitary one of the present hospital.

SECTION II

Fermentation caused by Damp on the Soil of Bangalore is the Cause of Plague at that place

Pages 35 to 44

WATER was difficult to obtain in Bangalore till the Government introduced an abundant water-supply into every street. The people made very free use of this ample water-supply.

2. No provision made for carrying off the washing which soaked into the soil. Plague, the result of the stagnation and fermentation caused thereby.

3. The Officer who carried out the water-supply submitted three different schemes for simultaneously draining the town.

4. The Corporation talked and discussed but did not sanction drainage of any kind.

5. The Government may have stepped in and forced the Corporation, but this would have been considered a backward policy.

6. Plague first broke out at Blackpally where the damp was greatest, and from there spread rapidly to other parts of the town which were as fuel prepared for the flame.

7. The first effects of the plague on the Hindus were lamentations and more devotion to their idols.

8. Some of the Muhammadans considered the plague an English manufactured disease to kill them and the Hindus because the English did not suffer from it, so they were very morose and angry.

9. Did not realise that the plague was the result of the violation of a fundamental sanitary law.

10. When the Muhammadans saw that British Officers were disinterestedly trying to help them in bringing sunlight and air into their sodden buildings, and in drain-

ing their water-logged localities, a new spirit of hearty good feeling was shown and they became very helpful.

11. Knoxpet erected by the British under the Ulsoor tank suffered badly with the plague, and is still plague-infected though its houses have been improved in their sanitary conditions. Rural re-housing and sanitation require very much attention in South India.

12. Blackpally under the Miller's tank, Ulsoor and Knoxpet under the Ulsoor tank, and some golla streets, the dampest localities in Bangalore, formed germinating beds for the plague, from them it spread to other localities.

13. The rat and rat-flea had something to do in spreading the plague, but it was found in Bangalore that where damp abounded there plague originated.

14. The rat and rat-flea merely pass on the plague and are not its primary cause. In Bangalore, damp fermenting into the soil originates plague. The rat is a kindly provision by Providence to warn men of the near approach of disease.

15. The draining of Miller's tank has greatly reduced plague in Blackpally. Not much reduced in places under the undrained Ulsoor tank.

16. The observations now recorded are made for the special benefit of the poor and for further investigation by the scientific. They have been put to practical proof in the construction of Fraser town which is both Plague-proof and a health resort.

17. In dealing with malaria, it was not found sufficient to kill the mosquito. Swamps were drained and other measures adopted to get to the origin of the disease. So also with the sleeping sickness and the yellow fever. With God's help, the same should be done for the plague. Its origin should be found and remedies applied.

18. Plague is a creature of the soil in which it is made or destroyed. Man also is a child of the dust and the plague of the Universe. The millionaire is made by or-

ganisation. The common man by organisation and God's help and righteousness can raise himself above plague conditions. This is the message of the plague to suffering mankind.

SECTION III

Plague has Greatly Increased the Alcoholic Habit in India

Pages 45 to 56

Fear of plague, and the sorrow it caused, set nearly all the Indian people drinking. Some advised alcohol as a plague preventive, and others as a help in curing the disease.

2. People in their fear and in their sorrow ran madly to the liquor shops, and strong drink became the direct product of the plague.

3. The story of the Plague Angel and the Holy Fakir.

4. In other parts of South India also on an outbreak of the plague people became drunken.

5. The alcoholic habit is accompanied with other evils and is not easily shaken off.

6. The drink habit has made the servant class of Bangalore unreliable and has become a great evil to all South India.

7. Alcohol is not good for the plague but is followed by a reaction and collapse. Some consider it as poison to a plague patient. The stimulant should continue to sustain and this alcohol does not. This fact ought to be loudly proclaimed all over South India in all vernaculars.

8. In the countries of Europe, the drink habit is a remnant of past barbarism. But India was a temperate country. Young India is now taking to the drink habit.

9. A modification of the English Excise System has been foisted on India and alcohol manufactured under

Government supervision ; a people who, by religion and habit, were total abstainers are thus encouraged to drink.

10. A Madras Civilian, it is said, was sent to study the Excise Systems of Europe, and to introduce them into South India ; but Europe is moderating its old drinking habits. Plague has increased drunkenness amongst all classes of the Indian people.

11. An eminent Edinboro' Medical Professor's opinion on the effect of alcohol on the human system.

12. The strong drinking habits of the early settlers in America, stopped by the vigorous womanhood of that country, it is now a very temperate nation.

13. India has started on the downward drinking habit, and some think that it will slide downwards very rapidly. Can its womanhood save it ?

14. Europe is gradually awakening to the evils of alcohol. May not all wine drinking be prohibited at purely State functions, the Native rulers will follow this lead.

15. The sword was voluntarily made over to India when the Native Princes who rule two-thirds of the country were asked to raise and to maintain the reserve of the Indian army.

16. The Indian Princes have shown special enlightenment and enterprise in their rule as illustrated in the Mysore State. Their Excise Systems are modelled after the English. Will not the latter act very wisely in closing all its distilleries and in prohibiting the importation of all foreign liquor.

17. How a conscientious English Administrator excluded the Excise Rules from his portion of the Mysore Province for the good of its people. Dr. Johnson's opinion of wine drinking.

18. One of the first acts of the suffragettes if given the vote will be to deliver the poorer houses of England from the evils of drink.

19. What the great Abraham Lincoln said about the evils of intemperance.

20. German statistics regarding the evil effects of drink on that nation have made the Kaiser a total abstainer.

21. The drink habit is going to have a very bad effect on the future of India. A happy and prosperous people are of more value to a country than a large Excise Revenue.

22. Very great increase of the Excise Revenue in India in 1913. God has given India to England for a wise purpose.

23. The Roman subjugation brought a gift to England which has made it Great.

24. What gift is India going to receive as the result of its subjugation to England? Not merely to learn to speak the English language grammatically.

25. Retirement becomes compulsory in India at an age when a person has become most useful to the people and the country and has learned to know its needs and how best to do it good.

26. Some consider that licenses to sell liquor should not be put up to public competition; and that the Licensing Department should be separated from the collection. The remedy which will do most good to the people will be to stop all alcoholic manufacture and all alcoholic importations.

27. In South India most of the juice from the numerous palm groves is converted into a fermenting intoxicant, whereas, it can be made into a high grade sugar. The intoxicant brings a large revenue to the Government which the sugar does not.

SECTION IV

Defects in the Teaching in Primary and Secondary Schools—the Bi-Product of the Plague

Pages 57 to 65

Part of the large increase in the Excise Revenue, due to the increased drink habit created by the plague, is given to new schools, which have thus become a bi-product of

the plague. The orthodox Hindu Excise Contractor's way of appeasing his conscience.

2. The present method of teaching through the English language is a loss of time and effort to the Indian.

3. The teaching in system and subject should be what will most benefit the children of India.

4. His own vernacular is the medium through which an Indian boy can acquire the most information in the shortest time. Teaching in his own vernacular, on the many subjects connected with advanced agriculture and the industries connected therewith will be most useful to the bulk of the population of India.

5. There is an ancient and rich literature in India which an Indian enjoys more than the modern productions of Europe.

6. European sports an unsuitable foreign product. Indian exercises, which combine sport and instruction, will be more suitable and acceptable.

7. The school teachings are not of a kind by which an Indian boy can make the most of his life. To merely equip for Government employment may have been enough for the few in the past; but now something broader should be aimed at.

8. Agriculture and all the varied industries connected therewith will afford this broader basis, and will also be more suitable to present Indian conditions.

9. Some of the best ryots and Indian craftsmen do not know English.

10. The Indian educational system is modelled somewhat after the English, whereas, the two countries are very dissimilar.

11. How different the intense cultivation of the Italian soil looked to a stranger when compared with the fallow-looking condition of English land.

12. In the new impetus now being given to a national kind of education, the teaching should be in the vernacu-

lars, and of a nature to conduce to wealth and greatness of the country.

13. The newly formed Industrial Department should direct primary education and not the so-called Educational Department, which should have charge of the High Schools and Colleges.

14. The Industrial Department will be more in touch with the requirements and the resources of the people and the country and can do away with the village sowcar who has taken the place of the Pindari of old.

15. The Land Improvements Act as now administered is a failure.

16. One who has mingled intimately with the people in floods, and famines, and in large city works, and who knows them well—their wonderful aptitude and their patient industry, desires with God's help to do them some little good.

17. An experienced missionary proposed to teach his students to qualify for Government employment, to the neglect of those essential things which modern experience has shown can make the country rich and great.

18. Good material is thus being wasted and a change is very necessary.

19. The acute Bengali intellect, by the present system of education, is taught to look for Government employment and would naturally become unsettled if this cannot be obtained. It should be directed to making India one of the chief suppliers of the economic wants of the whole world. Ninety per cent of India's dense population are agriculturalists who should be waked up to correct modern methods and requirements.

SECTION V

The First Rule that Made Fraser Town Plague-Proof

Pages 66 to 73

GOING back to the plague proper, observations in Bangalore showed that, whenever there was continual damp and stagnation of sullage soaking into the soil, there plague was sure to be found.

2. This was not only the case in the insanitary overcrowded Indian portions of the town; but also in the open spacious best favoured localities. The plague shows no favours in Bangalore when certain sanitary laws are disregarded.

3. There is more plague in Bangalore during the damp season than in the hot dry weather; though the rat and the rat-flea are much the same during all weathers.

4. It may be said that heat kills the bacilli in the hot weather and that damp in the soil may not be the reason of the excess in the wet season but in Calcutta there is most plague during the hot season, and least during the wet months. The reason for the difference lies in the soil. In Bangalore, the soil when affected by damp generates the plague germ. In Calcutta, it lets loose certain chemicals which destroy it.

5. Scientific investigators of the plague are advised to examine the chemical composition of the soil in different places to ascertain if this is not a correct conclusion.

6. A consideration of the conditions of the city of Madras and the reason for its immunity from the plague. It is not a sanitary model. Some parts are very dirty and filthy. It has rats in abundance. Plague has been brought into the city more than once from plague-infected places but it still continues free from the disease. The reason is said to be the chemical composition of its soil which kills the plague microbe.

7. On a comparison of Bangalore, Calcutta, and Madras, though the rat is very much the same in all these places, yet the plague affects them differently on account of variations in their soil. The rat, a merciful provision of Providence to warn men of the near approach of the plague.

8. It was found in Bangalore that while damp stimulated the plague good drainage removed it. Mr. Harris therefore drained the parts of the native town where there was most plague with the best results.

9. This led up to the first great rule in making Fraser town plague-proof, viz., to countersink all its roads about 1½ feet so as to keep the building sites on either side high and dry and well drained.

10. Fraser town is plague-proof because it is in the first instance dry and well drained. But the same rule may not apply to other towns. Observation and experiment will decide what is best for each place.

11. The observations made at Bangalore were put to a practical test at Fraser town and were found correct.

12. Explains how the effect of the natural drainage passing along the upper soil was counteracted.

SECTION VI

The 2nd, 3rd, 4th and 5th Plague-Proof Rules Explained

Pages 74 to 84

THE second plague-proof rule is to have the basements of all houses 1½ feet high and constructed of stone rubble pointed on the outside with good cement. The first rule will keep the sites dry. The 2nd rule will keep the houses dry and prevent vermin burrowing into them.

2. There had to be great care in arranging the character of the buildings. To build primarily for the poor. To build sanitarily and on plague-proof rules and to get a fair return for the money expended.

3. To build the house so as to meet the above requirements and to run the scheme on sound business lines often a middle course had to be adopted.

4. The third plague-proof rule was a hard floor impervious to vermin. The cow dung smeared floor was almost a part of the Hindu religion so that this rule had to be very carefully explained.

5. As Brahma's second birth was from the belly of the cow everything connected with this animal was considered sacred. The plague has shaken the beliefs of many Hindus in the integrity of their traditions.

6. Both Hindus and Muhammadans were keener on building bazaars than houses. All bazaars had interior stone skirtings.

7. A repetition of the first three rules and an explanation regarding the way the land was divided into building blocks and building sites.

8. In each building site only $\frac{1}{3}$ was to be built on and $\frac{2}{3}$ to be kept as an open area all around the building. The area to be occupied by the building was decided after measuring up the area occupied by the poor in the congested parts of the town.

9. This method of building is a modern sanitary improvement adopted in other parts of the world.

10. The way the plague worked in the golla street of Ulsoor is explained; this led up to the above method of building being converted into the fourth plague-proof rule.

11. It improved the general conditions and ways of Indian living and especially benefited Indian child life.

12. Great vigilance was required in enforcing this rule as most builders considered that they had a right to cover the larger part of their sites with buildings. Very great care will be required to prevent the infringement of this rule in future.

13. All the houses had windows or ventilators opening into the external air but, as these are easily closed by the

occupants, some method had to be devised beyond the reach of the people to adjust.

14. This led to the fifth plague-proof rule. *The use of the Mangalore tiles* for the roof covering of all the buildings. It is the old Roman pattern tile with open joints through which continual ventilation passes night and day.

15. The first batch of evicted people from congested Blackpally could not stand this continual ventilation but are now accustomed to it. These tiles also afford no lodgment to mice or rats.

16. The five rules which make Fraser town plague-proof and the most sanitary built town in India recapitulated.

17. Improvement in economic conditions in India will cause social and sanitary improvement, better housing, and a higher standard of living all round, this will react in permanently expelling the plague from India.

18. The economic improvements in Germany are held up for Indian imitation. Its political ambitions should be a warning to the leaders of India who would best devote all their energies to economic improvements which will also indirectly prove plague preventions.

19. The Indian Expeditionary Force like the Crusaders of old should return with knowledge which will permanently enrich India and thus become plague preventions.

SECTION VII

Some Plague Experiences and Deductions Therefrom

Pages 85 to 93

THE rat is associated with insanitary surroundings and is considered as a sort of unclean vermin.

2. The squirrel is the opposite, it is beautiful in its looks, and clean in its habits.

3. Yet both are alike liable to the plague.

4. The rat and the squirrel are not infected by the flea, they rather infest the flea and thus impart the plague to man.

5. The rodent is affected by fermentations and chemical changes in the soil caused by damp, and the infection is attracted down to the rat hole and up to the tree tops.

6. Plague was often taken into Fraser town by the plague-infected ; but it does not remain there.

7. Having succeeded in keeping Fraser town dry it is therefore plague-proof.

8. Like Fraser town, plague has been often taken into Madras, yet it is free of plague through something in its soil.

9. Suggests that experiments be made by impregnating the soil in the damp places of Bangalore with crude sulphur.

10. The squirrels on the huge solitary Ficus tree in the compound of the Mayo Hall become plague-infected.

11. One fell at the Engineer's feet and died, and a person in his office contracted the plague and died.

12. The peculiar travelling propensities of the plague. Originating in damp it travels and its route is marked by dead vermin.

13. Where sanitary laws have been neglected people also died.

14. Suggests other experiments on the Bangalore soil, without, and with, powdered sulphur.

15. Madras is like an index finger pointing out that something in the soil can keep plague out of a place.

16. English people who live in open localities would be plague victims if plague-infected rats and fleas were allowed in their houses.

17. Two English girls who contracted the plague and the cause. Plague occurs in the same house repeatedly, because the habits of the occupants have not changed.

18. The best good Fraser town is doing is in teaching

the poorer classes of natives a better way of living, it is of special benefit to the health of the children and to coming generations.

19. The remarks made on the plague are intended for the good of the people.

20. Thankful to Mr. Fraser and to others for allowing the new rules to be introduced in the building of Fraser town.

21. The fire in London did not finally cast out the plague in England. Improvements in the economic and sanitary conditions of the people effected this.

22. Advocates a new mass movement to improve the economic and sanitary conditions of India as the only means of finally casting out the plague from that land.

SECTION VIII

Describes How Congestion was Relieved in the worst Overcrowded Indian Localities

Pages 94 to 104

INDEX TO SECTION VIII—The removal of congestion in Bangalore was made in an original manner.

2. A large portion of ancient Mysore was divided up amongst a number of Poligars or Petty Chiefs who kept their own armies and oppressed the common people. They often quarelled with each other and sometimes with their own Maharaja.

3. This system made it easy for a brave soldier like Hyder Alli to become the Sultan of the whole of Mysore. His son Tippu Sultan was too busy with Military ambitions and exterior conquests to introduce a more settled form of Government in Mysore.

4. When the English conquered the Province they reinstated the old Hindu Maharaja but had some trouble with the wild and powerful Poligars.

5. To keep the Maharaja on his throne, to check the power of the Poligars, and gradually introduce an enlightened form of Government into Mysore, a tract of land was assigned for the location of a British Military force, this formed the beginning of the Civil and Military Station of Bangalore.

6. In ancient warfare a large retinue of camp-followers was a necessary evil. And to be ready for any emergency they had to be located in different parts of the Cantonment under Military observation and control. This was the origin of the different sections of the Indian portions of the Bangalore Cantonment.

7. These Indian portions of the town were at first well laid out, but families and hangers on increased, and huts and hovels were added, till the places gradually grew very congested, became very insanitary, and were the chief regions of the plague.

8. A census showed that the congestion in the Indian sections of the town was from about 250 to 300 persons per acre. As the health of both the Military and the Civilian depended so much on the Indians it was resolved to build three new extensions solely for Indians and to open out the congested Indian localities.

9. The rules by which the first extension was carried out have been already explained. A usual method for improving old localities is to form wide boulevardes and flank them with new palatial buildings but this, though very spectacular, does not sometimes touch the most congested parts, where the poorer people reside. These may be outside the boulevardes.

10. To obtain a bird's-eye view of a congested locality, Mr. Harris, I.C.S., the Collector, and Colonel The Hon'ble Sir Donald Robertson, the British Resident, went on to the tops of the houses; hence it was observed that the greatest congestion was amongst the hovels and huts well behind the principal streets the removal of which would admit light and air where it was most wanted.

11. The Hon'ble Mr. Stuart Fraser was taken over the mud roofs of a congested locality, they were so closely packed together that he was able to walk over them for some distance in either direction. In this case an interior open square was formed and connected with the road. These methods give the maximum degree of sanitary improvement where it is most required and at a minimum of cost.

12. The details of the method by which the area and proportion and quality of the portions to be removed is explained.

13. The method of preparing an estimate of cost is explained. By working through panchayats of the leaders of the people a saving of 25 per cent on the legal valuation was effected, the people were pleased and happy, and no appeal was made in any one case. The Government should be grateful for the gratuitous help rendered by these panchayats.

14. Mutual trust and good feeling between the common people and the executive made a difficult work agreeable.

15. Colonel the Hon'ble Sir Hugh Daly, Resident in Mysore, Surgeon-General the Hon'ble Sir Pardey Lukis, Director-General, Indian Medical Service, were taken over some of the congested portions of the town next to be improved. They also viewed the congestion from the higher houses and approved of the detailed plans of what was proposed.

16. The method of removing the worst huts in the most congested places behind the main streets was most suitable to Bangalore; but there may be other places where this and the forming of wide boulevardes may be combined.

17. The common people from whom houses were acquired were very amenable when influenced by good leaders; but the same people would have been just the other way if influenced by unscrupulous leaders. Some

leaders at present seem to be deluded by incorrect war news.

18. As the womanhood of the early settlers of America stopped the hard drinking habits of its men in those days; so, cannot the stronger and more enlightened womanhood of Europe and of the whole world federate and organise to stop wars and the slaughter of their men. If they organise and devoutly put their case into God's hands, He will work out this great change for them.

19. After the removal of the congestion as already explained the people were asked to improve the houses that remained and many responded.

SECTION IX

Historic

Pages 105 to 115

HOUSE occupiers refused to build their own houses in Fraser town.

2. Government loans on easy terms were arranged for them and some were given sites; but yet they refused to build.

3. The place was at first raggy fields and they did not care to build out of the town.

4. Even capitalists came forward to build only after Mr. Lindly gave the lead.

5. There were many things then against the locality.

6. A new extension was the only means by which the poor in the congested parts could be relieved.

7. Capitalists deserve great praise for spending money freely on new and untried rules, and methods which may have failed.

8. Recommends that their names be inscribed on a stone obelisk in a prominent position in the town.

9. Mr. Ruthna Sing made some of the houses he built and owned into an artizan colony.

10. As newly arrived fresh young Englishmen and women are very liable to enteric, even so the plague is a rat disease.

It is not the cause, but the victim of the plague.

11. The real cause of enteric is known and is being removed.

12. So the cause of the plague should be discovered by experiment and overcome as at Fraser town.

13. The Executive sympathized and tried to help the philanthropic builders.

14. Gave them the earth from the countersunk roads to make bricks with.

15. Helped in revising and quickly arranging all plans of buildings erected.

16. The neglect of the economic conditions of India is keeping the country poor.

17. The building of tanks by the old Hindu Governments advanced the agriculturally economic prosperity of South India.

18. How a young man, who gave up Government employment, and went into economic business prospered beyond all expectations.

19. When the economic conditions of India are improved, the people will realise and appreciate the value of British Administration.

20. These things are mentioned because the writer cares for the people of India and desires to see the sorrow caused by the plague removed.

21. Fraser town a health resort and the poor white's paradise. The poor, both black and white, live in Fraser town in peace and security.

22. The soldier's widow with her clean three-roomed cottage and garden for a rental of only rupees three.

23. The necessity for vigilance in the future.

24. The publication of this paper that the importance of the rules adopted may be understood and observed.

25. Historical—The whole scheme of improvement

first submitted by Sir Donald Robertson after approval by the late Sir Arthur Branfoot.

26. The portion sanctioned and carried out submitted by Sir James Bourdillon.

27. The original methods on which Fraser town was built as a plague-proof town encouraged by the Hon'ble Mr. Stuart Fraser.

28. Mr. Fraser asked to give the town his name. Its great success both sanitarily and financially. It has become a model which some other parts of India are trying to imitate.

29. Should be introduced into every town in India and the people learn that the best social reform will be a more sanitary way of living. It will most benefit the children and coming generations.

30. The work of England in India is a remarkable fulfilment of ancient prophecy made more than 2,500 years ago.

31. The consummation of England's work will be to raise the Princes of India to an exalted place in the great parliament of the nations of all the earth; and to make the Indian Nation a great and glorious people.

END

SECTION I

Condition of Bangalore at the First Great Outbreak of Plague

To understand aright the principles according to which the Indian parts of Bangalore were opened out and its new Extension, Fraser Town, was made plague-proof, it will be necessary to first consider the exceptionally plague-afflicted condition of Bangalore for some years before Fraser Town was built, and the practical lessons learned therefrom. It was these lessons learned amid the ravages of the disease, which suggested the principles according to which the town was built, and which have rendered it immune from plague. It was no easy work. It required nothing short of going in amongst plague-affected houses and the plague-stricken ; it meant the laying aside of official conventionality, and joining the stricken people in a fellowship of sorrow, that one might, as it were, beard the lion in his den, learn his secrets, and make use of them for future guidance, and the good of poor humanity.

2. The plague first appeared in Bangalore in September 1898, and continued in a very severe form for some years. It was known to be a preventable disease, and it was considered to be the first duty of any one who desired to help the people in this dire calamity to study its causes, so as to mitigate its ravages. For this purpose nearly every plague-infected house was carefully examined, and the reason ascertained why that particular house, more than any other house, was plague-infected. It was found very frequently that DAMP—damp caused by a continual stagnation of water and washings into the soil, and damp

from any other cause which gave rise to chemical action on the soil of Bangalore was an almost invariable contributing cause of plague.

3. In making these examinations, one had to mix freely with the plague-stricken people in their humble homes in the low native quarters of the town, and the scenes of sorrow and distress one saw there were heart-rending. Often young and strong husbands and fathers were stricken, and the family was left suddenly destitute, while young mothers, and little children, were also continual victims. There was hardly one house in the poorer localities in which some one had not died. In some cases whole families, father, mother and children, were all taken away, and the humble home left truly desolate. It was worse than what the slaying of the first born in Egypt must have been to that once proud people. The wail of sorrow from those poor desolated homes, rose to high heaven in a humble cry for help, and human sympathy tried in vain to do all it could to relieve these afflicted ones. How small a thing was all human aid in the face of this great sorrow! It was not the time to teach these poor bereaved ones, that it was the voice of God telling them, and some of their leaders through them, that the transgression of any law, sanitary, or moral, will bring retribution. How, without knowing it, a fundamental Sanitary law was grievously broken and disregarded in Bangalore, will be explained further on. Many a judge, with a heart full of love, had yet to administer justice, and so this people suffered.

4. The plague regulations of that time, though well-meant, and emanating from that very high authority, the Government of India, added greatly to the miseries of the poor and afflicted people. All the family of a plague subject, and all those living in houses adjoining, were *forcibly* removed to distant camps. The state of the young children, and young women, under these conditions can be better imagined than expressed. The people dreaded the plague regulations more than the disease itself, especially

the Muhammadans, whose ideas of gosha were directly violated by them, the result being that the plague-infected were secreted till death, and, after death, the corpse was left in the house, and all the family and the neighbours decamped to places beyond the limits of the town, often carrying and spreading infection to other places.

5. In some cases, with a strange sense of irony, plague corpses were left at night in the compounds or verandahs of some European official's residence, and the family fled. People knew that, at the worst, the English would see that the corpse was properly buried. In one case a corpse was left standing against the closed door of an official's house. In the morning, when the door was opened, the official had a gruesome welcome. Some of the corporation officials, with their own hands had to carry out half-putrefied corpses from abandoned houses. These plague regulations, it is understood, were an adaptation of those in use by the Russian Government, in dealing with its plague-stricken northern subjects. The budmashes of Bangalore had a glorious time in looting abandoned houses. It was as if all the spirits of evil were let loose on Bangalore. No doomed city of ancient History can have experienced greater sorrow than the poor of Bangalore at that time.

6. As soon as tender-hearted Britannia knew how hard these dreadful regulations were on her Indian subjects, they were at once abolished, but the poor of Bangalore had, in the meantime, endured a baptism of suffering which will never be forgotten.

7. About this time, those very humble, but necessary, and often brave men and women, the sweepers and scavengers of the town became frightened owing to the severity of the regulations, and left Bangalore without permission. There is no water-borne conservancy in the old-fashioned town. All night soil, from all closets, is removed by hand. When the sweepers and scavengers decamped, there was no one to do this very necessary

and important work. In addition, it is to be remembered that street rubbish from the public dust bins is also removed by hand into carts, and conveyed to the fields beyond the town ; the public roads are also swept, and all droppings removed by hand, and when all the people who attended to these very necessary works deserted the town, for some days, fair Bangalore was a spectacle to make mortals shudder, roads unswept, heaps of vile house-sweepings and fermenting rubbish at every street corner, night-soil accumulating in every closet, both Native and English. Verily, Bangalore then looked as if it would soon expire, under the weight of its own unburied filth and fermenting rubbish. The eruptions from Vesuvius, were, at worst, spasmodic and always healthy, whereas, the emanations from about 150,000 people, and many thousands of horses and cattle, were continuous and always offensive. This greater crater of always discharging filthy matter, would soon have made a quick end of Bangalore.

8. But there was at that time a very energetic person at the head of the local administration in the person of Colonel Robertson, Resident in Mysore, afterwards Sir Donald Robertson, who was one of those Military politicians who, in a hearty and ready way, is equal to any emergency. He immediately imported scavengers from the Bombay Presidency—obtained cattle and carts from the Mysore Province, and soon had the whole town, and all the public and private closets, swept and cleaned.

9. He also selected a very energetic officer, Colonel Roe, R.E., and made him the head of a Special Plague Department, with a staff of medical officers imported from other parts of India, and instituted a regular house-to-house inspection, and the control of all cemeteries, where plague corpses used to be buried at night without notice. He enlarged the two special Plague Hospitals, and imported English nurses to look after the large number of plague patients, as good nursing was said to be more important than medicine for this form of disease. It was

truly a titanic work of organization, but it was soon done, and hope and order was evolved out of chaos and dark despondency, and fair Bangalore rose from its plague cursed filthy surroundings to be again the garden of Southern India.

10. Those English nurses were a well-thought-out addition to the plague establishment, and were a great help to the poor and afflicted. Clean and well-trained, they put their arms around the dirtiest and most unclean looking sick, and gently attended to them. Undaunted by the plague, which was then considered infectious, they received in the kindest manner every sick person, whom the newly-formed plague department sent into the hospitals, and at once attended to them.

11. If the patient were not too long delayed before reaching the hospital, kindly nursing helped them over the disease, and bubonic plague, if attended to in time, was found to be curable, and good nursing had most to do with the cure. But, alas, most of the cases sent to the hospital had been secreted in the houses till it was not possible to secrete them any longer. In one case a Hindu Municipal official had the plague on him, and though he must have suffered pain, he attended office and continued to do his work as usual, and left at 6 in the evening. Next day he was dead. Had the poor fellow at once informed the plague officers as soon as he felt the illness coming on him, he would have been attended to without delay, and might have been living to this day. The strictness of the plague regulations frightened this man, and were the cause of his and many other deaths. Many plague-stricken ones in the last gasp of death were received by the kindly and well-trained English nurses, and their last moments of life were soothed and comforted.

12. After the severest part of the outbreak of plague was over, these nurses, splendid ministers of mercy to "pain and anguish," disease and death, of the worst

kind, returned to their own country. Their work was beyond human praise and honouring.

13. It will be some satisfaction to the friends and relations of those they helped, to know that all possible official honours were conferred on them. They deserved something that might be handed down in their families after they have passed away. A soldier, if he only shows his face on a battle field, can claim a medal, and a separate clasp for each engagement in which he may have taken part, but these devoted nurses were in the jaws of death all the time, amid all the depressing and distressing influences of the worst form of disease, and with silent contagion all around them, requiring more courage and devotion than the bravest of our heroic soldiers on the battle-field. Surely, under such circumstances, an award which they can hand down to their posterity should be conferred on them.

14. It is said that when the plague deity visited the Caucasus in about 600 B. C., Apollo supplied Abaris, his favourite priest, with an arrow, on which he rode safely through the air to Greece, and thus escaped from the plague. The Chief Plague Officer had, apparently, learnt some lessons from this ancient story. He arranged for camping grounds in the open fields outside the town, and supplied those who required them, with bamboos and mats for temporary huts, in those fields. Very many took ready advantage of this opportunity to leave the plague-afflicted town. Colonel Roe, though a true son of Mars, unlike Apollo, did not supply them with heavenly food all the time they camped out. He, however arranged for bazaars in the camps, and the stay of the people there was a regular picnic.

15. While the people were away, their houses were thoroughly cleared, and disinfected with perchloride of Mercury and other less expensive disinfectants, and, after a few weeks absence, the people returned, invigorated by this open-air treatment, to much cleaner and healthier

houses. Very many precious lives were saved by this simple and sane thoughtfulness. The people had a true friend in that energetic and practical chief of the plague department, at a time when they appeared to be forsaken by their best friends, and when one's closest relations often deserted those whom they ought to have shielded and protected. Apollo's arrow, while flying away with his favourite priest from the plague at the Caucasus, is said, on another occasion, to have rained plague germs into the camp of the Greeks before Troy. We must, however, return to the unpleasant story of the plague in Bangalore.

16. Before closing this section, a reference should be made to inoculation. This was not pushed so much in the early stage of the plague as afterwards. The security it afforded was not fully understood, and the quality of the lymph used at first was by some considered to be too severe, and by others too mild. It was afterwards made very popular by some of the leading Hindu citizens coming forward and allowing themselves to be publicly inoculated. Also, as it incapacitated one for work for a few days, some of the wealthy citizens of the town showed a very public spirit by coming forward and paying batta to the poor people inoculated. Through this well-timed liberality, nearly all the non-caste population of Bangalore were inoculated.

17. At the next outbreak of plague, it was found that nearly all the non-castes were exempt, and only the caste people were easy victims. This so exercised the caste people, that they also came forward in large numbers to be inoculated. Major Standage, Residency Surgeon, who had by this time succeeded Colonel Roe, R. E., Chief Plague Officer, inaugurated a vigorous campaign of house-to-house inoculation amongst the most respectable castes. Thus, in a short time, both the non-caste and caste people were protected. Many valuable lives were saved by this timely popularizing of inoculation by Major Standage,

I. M. S., and the Hon'ble Mr. Stuart Fraser, the Resident in Mysore, who showed his interest in this matter by being present at several large inoculation gatherings.

18. But, at best, inoculation was only a protection, and even as such, its effect was said to be shortlived. It did not go to the root cause of the plague, and try to destroy it there. However, it did good to the people, and quite a large number benefited by its means, and, as batta was paid, it allowed working people a two-days' holiday. This plague expenditure soon made the Bangalore Corporation bankrupt, but the Government of India came forward with help, and the plague department, and the plague hospital, in a very limited form, still continue as relics of past trouble and disorder. A permanent isolation hospital should be erected, with better sanitary surroundings.

19. When the plague department was formed, it was found that those cleaning and disinfecting the plague-houses were very liable to contract the disease. The germ seemed to attack them through the soles of their feet and through wounds in their hands. They were supplied with heavy boots, and this, it was found, formed a good protection, while those with wounds in their hands were not allowed to work.

20. This throws a side-light on the character of the plague germ. It is on the soil, and also a few feet above it. The more this subject is considered, the more apparent it will become that the little rodent and the flea are victims and channels of communication of the plague to man, but they are not the primal cause of the plague and the plague life. This is formed in the soil, and travels in it and in the air immediately above it.

SECTION II

Fermentation caused by Damp on the Soil of Bangalore is the Cause of the Plague at that place

JUST before the outbreak of the plague in Bangalore in 1898, the new pipe water-supply was given to the Town. Before this, water had to be drawn from deep wells, or carted from surrounding open reservoirs, an expensive process, so that the luxury of water to the poor was very limited. It was sold by the barrel or the ancient sheep skin. When good filtered water was brought to their very door steps, and had only to be drawn from the public stand posts, the poorer people revelled in this new-found joy. It was to them a gift of the gods, of which they made a very free use and were very thankful to the good Government of the day. An abundant supply of good water, and all for nothing, to drink and to bathe in, and even to wash their clothes in, was to them a modern miracle. There was no more the carrying of the brass vessel or the humbler chattie to the deep and distant well; no more spending their hard-earned pice on buying a bucketful of water.

2. No regular bathing ghats were constructed, so that their dark hovels, and undrained backyards were used for washing purposes and the water stagnated, was absorbed, and worked a silent work. The people played with the abundant water-supply, as children with a new-found toy. But alas! alas! they did not know, that while the Government had done them a great good in giving this abundant supply of pure and wholesome water, the Municipality, some of their own representatives, had been almost criminally neglectful. The greater portion of millions of gal-

lons of good water brought into the town, remained there, soaking into the hovels and backyards and narrow alleys, and by its action on the soil, becoming stagnant cesspools, giving out miasma and causing disease of all kinds, it was then that plague first came into the town it is believed as a direct result of this stagnation of moisture in the soil of Bangalore.

3. The exceptionally smart officer who carried out the water-works scheme, foresaw the necessity of a drainage scheme going on simultaneously with the water-supply, and submitted three different methods, worked out in great detail, showing how this could be done.

4. But Municipal Corporations were talking and discussing. Much talking amuses some, and makes others appear very erudite, while the people who elect them think, that those who talk much do the most, and so they talked and discussed as to which of the three schemes submitted was the best. In the meantime the water-works, which were carried out by the Government were completed, and millions of gallons of water flowed into the doomed town, most of it was absorbed into the soil, and set up silent chemical actions and fermentations, and the outbreak of plague, a preventable disease, was one of the chief results. A very flagrant breach of a well-known sanitary law brought its own punishment, and the poor died like shepherdless sheep.

5. It may be thought that the Government ought to have stepped in and prevented this grievous wrong to a lot of ignorant people. But where there are free representative institutions even the power of Government has its limitations, and we are witnessing more of this daily in other parts of India. Some think that it is not for the good of the country as a whole, but the leaders of the people demand it, and it is supposed to be the essence of liberal Government to accede to the wishes of the people as voiced by their leaders. Some can learn only by experience, and often it is a hard teacher, as was the case in Bangalore.

It was not want of funds which caused this delay in the construction of the drainage scheme for the corporation then was rich, and had a large balance at its bankers. It was just the spirit of discussion and a procrastination, not new to India, and also perhaps a want of knowledge of the danger of delay. The corporation had then two eminent Engineers on the Board, who possibly may have forewarned it of the danger to the town in a plentiful supply of water stagnating in its low native quarters, causing immense discomfort to the people because there was no means by which the daily washings could be carried away at once beyond the limits of the town. Perhaps it was considered that the poor people should not wash themselves so freely, or it may be it was thought that the soaking of good water into the soil was not a very great danger. Possibly in some places, and in some soils, it is not so great as in others. In houses with compounds, where the washings could be used for gardening purposes, as was the case in most English houses, it was no danger at all. But it was rank poison in the low undrained over-crowded native quarters where the washings sank into the mud floors of the hovels, and where, by the chemical action of the soil, it set up a fermentation, breeding a damp miasma, and setting free microbes sufficient to destroy a robust nation, and before which the poor of Bangalore had no chance whatever; so plague broke out in the town, and hundreds died daily.

6. The Plague started in Blackpally, where the damp was greatest. This part of the Cantonment was inhabited by native pensioners and the families of some of the large number of camp followers so necessary in ancient warfare, not very far above it in the same valley were formed the Miller's tanks, by banking up the valley at a higher level. When the tanks had water in them, Blackpally, lying below, was always damp and always unhealthy. In the old cholera days that disease always showed itself first in that part of the town, and now, with

this new supply of undrained water added to the old damp, plague also first showed itself in the town in this place, and from here spread rapidly to other parts, which were as fuel prepared for the flame.

7. The mild Hindu took the affliction with wails of sorrow, and lamentations of woe, and was content with making special sacrifices to his gods, and showing more devotion in his offerings to the spirits of evil.

8. Not so the Muhammadan. Though physically stronger as a race, the surroundings in which he lived, were, if anything, more insanitary than in the case of the Hindus. The sodden condition of his dark hovels and backyards, and the purdah habits of his women, were great helps in the generation and propagation of the plague microbe, and many Muhammadans were victims to this disease in Bangalore, whereas the English people were almost entirely exempt. The Muhammadan did not understand this, and what made it still worse, were the arbitrary plague rules introduced by the English. This caused a moroseness and discontent which pervaded the parts of the town inhabited by the more ignorant Muhammadans, and English people had to be very careful how they passed through some parts of Blackpally. When coming across the many Muhammadan funerals of those days, one had to be very polite and discreet, and avoid taking offence at visible scowls and inaudible mutterings. The lower and more ignorant Muhammadans considered that this new disease had been specially manufactured by the English, to kill off the Muhammadans and Hindus, and that that was the reason why the English did not suffer from it. They would have been better satisfied if both English and Muhammadan had shared alike, but, that one should be practically exempt, and the other die daily in large numbers, was to them convincing proof that the English were making the disease to specially kill off the mild Hindu and the more pugnacious Muhammadan, and there was visible discontent in some of the Muhammadan quarters.

9. It was not the time to point out to them their flagrant transgression of the most elementary sanitary laws, and that the way of transgressors is always hard, or that the English, with all their faults, had some regard to sanitation. All this came afterwards, and in the meantime, as far as possible, one sympathized with them in the great calamity which had overtaken them as an act of God, and that no doubt it was. In all wise and settled Governments, the transgression of law has to be punished, or the world would become a pandemonium, and unfit for human existence. Wrong-doing and death, or retribution of some kind, are Nature's inexorable rules. One can realise a loving God, and the angels, His ministers of mercy, mingling their tears with this sorrowing people.

> "Tis said that the morning stars
> Sang aloud at Creation's birth;
> That the sons of God shouted for joy,
> As He rounded this new born earth."
> But how can they sing on still,
> Looking down on these sorrowing scenes?

10. It was fortunate for Bangalore that there were then no political agitators about to fan this spark of ignorant discontent into an active flame of hateful action. Before this era descended on Southern India the discontent had passed away and was succeeded by one of hearty goodwill. When the Muhammadans saw that the English officers were disinterestedly doing their utmost in removing the worst hovels in their most congested localities, and were letting in the blessed sunlight and air into their sodden and darkened homes, and that their streets and houses were being rapidly drained, and all this done through panchayats of their own people to whom the evils of insanitation were being explained, a new knowledge and spirit dawned on their always intelligent instincts, and they commenced to appreciate and to love the English people working in their midst, and became most

hearty and helpful, willing to go to some inconvenience, in aiding those who were sincerely trying to do them good.

11. Knoxpet may be mentioned as another illustration of the ill-advised way in which the English have planted their more recent additions to Bangalore. This was laid out about 30 years ago, and was intended as a new suburb for the servant classes, and its position was fixed *below* the Ulsoor tank. Whenever there is water in the tank, Knoxpet is damp and unhealthy, and has become the great stronghold of plague. Attempts were made by the plague department to raise the walls of the houses and to improve the ventilation, but with very little improvement in the health of the place. It is still plague-ridden, and had rather a bad time of it last year (1913). Some attempt to drain it was made when it was first formed, but the drainage was defective, and has not been improved. If the villages planted by the old Hindus are examined, it will be found that, with all their defective sanitary knowledge, most of the sites of these villages are not below, but above, the level of the village tank, and are thus dry and comparatively healthy. This was probably done more for safety from the floods, caused by the surplus water of the tanks or from breaches in the banks, as, in so many other respects rural sanitation and rehousing are crying needs, and require a good deal of overhauling.

12. Thus Blackpally under the Miller's tank, and Knoxpet under the Ulsoor tank, and also all golla places, or streets where milch cattle are kept, suffered most from the plague. These golla streets, in all sections of the town, were plague nests. There is great room for sanitary improvement here. They reek with abundant and offensive damp, caused by the cattle urine, cattle washings, and fermenting rice water, in which Indian cattle are largely indulged, as it is believed that the more they imbibe of this water the larger will be the supply of watery milk. These three damp and sodden localities formed the generating beds of the plague

microbe from which it spread to other places. It cannot be said that there are more rats and fleas in these parts of the town than in the other native sections, as, for instance, in the grain bazaar, and yet there was more plague here than in most other parts. The highest scientific authorities have given very particular attention to plague investigation, and have declared against the plague-rat and the plague-flea ; they are doubtless correct but in actual experience it is found that places where there are not more rats and fleas than in other places, yet have more plague.

13. The rat and flea are perhaps more abundant in the higher than in the lower and more sodden localities, and yet there is often more plague in the latter than in the former. What can be the reason ? If the rat and flea are solely responsible for the plague, plague ought to be most prevalent where these abound most. But this is not the case in actual experience. On the other hand, it has been found that where damp abounded, there invariably did plague more abound in Bangalore. The rat and the rat-flea do doubtless pass on the plague, but this effect is secondary. They are victims, and not the cause of plague. So far as observation by some in Bangalore has gone, the primary cause of plague is something more than the rat. There is a power behind the rat, which is greater than the rat, where plague is concerned, and that may be described, as a miasma caused by soaking fermenting damp in the soil. It is a breach of a sanitary law. The plague is generated in damp, and propagated from damp, so far as the soil in Bangalore is concerned. The rat is a kindly provision of Providence to warn the families of men when the plague terror is approaching or passing over a locality. The poor rat is a sacrifice, that man may take warning and adopt measures of defence, so that the plague angel may pass over and not hurt him, and that the primary cause of the plague may be removed.

14. In Bangalore, plague has been greatly reduced in

Blackpally, by the draining and drying up of the Miller's tank, but it has not yet moved from Knoxpet and Ulsoor, and other places in the vicinity of the Ulsoor tank. This will probably not be done till after the sacrifice of a few more hundreds of lives. Unfortunately many Hindus worship water, and cannot find it in their hearts to see a tank drained.

15. The remarks now made are the observations of one who had ample opportunities, but who does not claim any scientific knowledge. He does claim a sincere desire to do what little good he can for his Hindu and Muhammadan friends, and so records these observations for the kindly consideration of those better capable of dealing with this matter scientifically. In the meantime the lessons he has learnt he has applied practically in the construction of Fraser Town in order to make it a plague-proof town, as will be explained further on. While laboratory work is very commendable, and not to be depreciated, observations made amongst the plague-stricken, in their homes, and amongst the surroundings of plague and poverty, may be of some small help to the scientist in his laboratory. In the meantime, the lessons learnt practically, have been used practically in the construction of Fraser Town, and have shown practical results, in having made that town plague-proof, and the health resort for the sick.

16. In dealing with the mosquito as the means by which malaria was propagated, it was not found sufficient to merely kill the little pest or to screen it out. The investigators went behind and beyond the mosquito, and drained all swamps and breeding grounds, and applied remedies to pieces of water that could not be drained. Just as in Africa and at the Panama Canal, the sleeping sickness and the yellow fever were traced to their source, and the necessary remedies applied there, so also should it be with the plague. There is no doubt that plague is a rodent disease, and that it is communicated to man from the flea of the rat or the squirrel, or the rabbit. But how

and where do these contract the disease? This should be the object of research, and it is there where the real remedies for the plague should be applied. Disinfection and inoculation are all very good in their way, but they are at best only protections and do not go to the root of the matter. They do not strangle the plague miasma, or the plague bacilli, or by whatever other name it may be called, at its source, and to do this, its source and origin must be first found. Except in Fraser Town, Bangalore is not yet free from the plague. As already stated, both Knoxpet and Ulsoor had it very badly last year (1913), though the rat and the rat-flea were as prolific in other parts of the town. This matter will be investigated further on, after the increase in the drink habit in Bangalore, and the fillip to primary education, the product and by-product of the plague have been casually considered. Whatever is stated here only applies to Bangalore. Conditions will vary with the soil, but it may be concluded generally, that the soil almost everywhere has something to do in originating, intensifying, or moderating the plague. Plague is made or marred by the soil. Man is also of the dust, but his vagaries and inconsistencies were so great, that he became the plague of the universe, and would have been blotted out altogether, but for the new life worked out for him in Christ Jesus, by which he is born again of the spirit—a new creature in Christ Jesus. So from the stress and sorrow of this other plague, new forms and ways of living can be evolved. New sanitary conditions forced on the bulk of the children of men, that will raise them out of the gutter and the slum, and give them a sort of sanitary emancipation. The world just now is the age of the millionaire. The labourer makes the millionaire. He slaves and sweats that a few may be made rich. Cannot this millionaire age be succeeded by one in which the labourer will make himself, will not give his strength to the millionaire, but rather use it to lift himself out of poverty and the dust, to a

newer and higher form of living? There is a great need for this change, and with God's help it can be done. God does not wish that only a few men should be inordinately rich, and others the plague-stricken of the dust. He wants all his children clean and healthy and noble, fit creatures of a great and loving Creator. The millionaire is produced by the power of organisation, planning, and combination. Cannot some great organisation of labour arise, not to pull down the millionaire from his self-made pinnacle, but to raise the common labouring man, so that he may have a just share in the fruits of his own toil and live above the slum, and the dust and the plague age? This is the message of the plague to the families of men. May they hear its voice, and with God's help emancipate themselves. But this can only be done, when that great curse of the poor, the drink habit is abolished, and the rule of righteousness installed. "Righteousness exalteth a nation, but sin is a reproach to any people."

SECTION III

Plague has Greatly Increased the Alcoholic Habit in India

As already explained, the plague brought great sorrow to the poor of Bangalore. With this sorrow and misery, there was mingled a certain amount of fear. Most of the people were terror-stricken. Friends and relations were dying all around in large numbers, and none could state who would be the next. In the midst of the comforts of Paradise the serpent entered, and beguiled the parents of mankind. It may therefore be judged that he would not be idle in these days of calamity in Bangalore. It was not, however, the guileful serpent on this occasion, but some of the more subtle tavern keepers who were the cause of trouble. "DRINK AND DROWN YOUR SORROWS" was their advice. Others went even further, and with the aid of would-be doctors who rose up in great numbers during this time of stress, advised that alchohol was a preventative against plague, saying, that those who were half-drunk, were less liable to get the plague, than those who were sober. Others again, went still further than this, and stated that alcohol, by stimulating the heart's action, prolonged the life of those already seized by the plague, and thus gave a chance for other remedies to take effect.

2. Also, to secretly nurse their sick, and to hide them from the searching eyes of the vigilant plague department, required more than ordinary moral courage, and what was defective in character, was made up for by the free and continuous use of alcohol. The people were heart-sick and terror-stricken, and alcohol had a siren voice of its

own, to charm and to entice to this form of cheer, and so the poor and deluded people ran madly to the liquor shops. Drunkenness, both in men and in women, thus became a direct product of the plague.

3. It is said that an ancient holy fakeer met the death angel leaving Bagdad, and reproached it with the number it had slain by the plague. The angel explained that the plague had not taken many lives, but that the bulk of people died through fear, and the effects of fear. The poor people of Bangalore were afraid, and it would have been probably better, if this fear had made an end of them, rather than leave most of them drunken debauched sots, useless to themselves, and worse than useless to all around them.

4. It did not require much persuading to induce people to go to alcohol as a plague preventative, the result being that, not only in Bangalore, but in many other places, people who lived sober and respectable lives, were, on an outbreak of plague in that locality, induced to become votaries of alcohol. And thus, very erroneously, through the plague scare, intemperance increased to a dreadful extent in India.

5. The spirit of alcohol unfortunately does not walk alone. Thieving and lying and debauchery, are generally his boon companions. Also when the drink habit is once formed, it is not easily got rid of. Plague may slay its victims and thus make an end of them, and they go down to the grave mourned and lamented, but it is not so with the drunkard. He, and worse, she, sink lower and lower in moral degradation till at last their friends are glad to see the end of them.

6. The effect of the drink habit, as the result of plague in Bangalore, is that about 90 per cent of the poorer classes are unreliable. Plague and drink, acting and reacting on each other, have fairly thrown the poor of Bangalore into the arms of the enemy, and some strangers coming into Bangalore to settle have had to leave the place as they could not stand the demoralised servant nuisance. If

this is the effect in other parts of India, where plague has since appeared, what a lamentable curse it must be upon a hitherto industrious and exceptionally temperate people!

7. The fallacy that alcohol is good for the plague cannot be too strongly exposed. It does stimulate the heart, but stimulation is followed by a reaction, which is generally fatal to a plague patient. For this reason some doctors consider it a poison in case of plague. There are other stimulants which are not followed by a reaction and collapse, but which stimulate and sustain at the same time, and thus give a chance to a plague patient. But it is not so with alcohol. Here the stimulation is followed by reaction and collapse, which often mean death, and therefore alcohol should be most carefully avoided. Oh for a trumpet voice to proclaim this aloud in every Indian town and village and in all vernaculars, so that the ruinous drink habit, which is following the plague scare, may be for ever stamped out!

8. In the countries of Europe, the drink beverage is a remnant of the barbarism of the past, and is now being gradually reduced. But it is different with India. The Indians were a temperate people. What a warfare they may have once had with the giant of alcohol in pre-historic days is nowhere recorded—With the Indian, when the countries of Europe found him drink of any kind was a disgrace. Priests and people alike might not indulge in the wine cup; caste, and custom, and the Koran alike forbade it. But these things are now very rapidly changing. A team of Indian sportsmen lately on their way to England carefully avoided beef, but openly called for ale. This seems to be the new spirit of young India. An adaptation of the English Excise System has been foisted on India, and yet there cannot be two countries more diverse in their conditions so far as this subject is concerned. It seems to be the fashion to think that what is found suitable for England should also be good for India, and so alcoholic spirits are manufactured under

Government supervision, whereas, probably, in old India of the pre-English days, it would have been a crime, and involved ostracism, to distil spirits of any kind, and a degradation to drink them. It is difficult for some to realise that Indian methods are altogether different from English, and India is best dealt with when treated in its own way. Many things have been done in India for which the English deserve the greatest credit and the most sincere thanks of the Indian people, but this cannot be said of its Excise System and its social habits in wine drinking.

9. A member of the Civil Service was deputed to study the Excise Systems of England and Europe, and to adapt the same in some modified form to India. The civilian may have done his work well, but have the people of India profited thereby? The Excise Revenues may have increased, but the drink habit which before was a degradation, has now been state-regulated. The mother country and Europe are gradually rising out of the old pit of hard drinking, and yet, sad to say, it is drawing India downwards from a nation of total abstainers to one of moderate drinkers. Where will the end be? It will not remain at moderation. It is very easy indeed to slide downwards, and India has started on this downward slide so far as the alcoholic habit is concerned, and the plague terror is helping it to go a little faster in this way, and is especially influencing the peasant and working classes, the backbone of the country.

10. An eminent Edinburgh Medical Professor, in trying to explain the action of alcohol on the human machine, compared it to the whip on a fagged horse. It does not in any way add to the strength and sustenance of the horse, yet it makes it go faster, though it is followed by a greater fag and weakness immediately afterwards, and so it is with alcohol at all times. It stimulates, without in any way strengthening the mind or body, and is followed by greater weakness.

11. The early settlers of America, it is said, took the hard drinking habits of the Europe of those days with them. In the new country, with less restraint, and more affluence, these early settlers drank more heavily; prosperity is a bad thing for the drunkard, as it only supplies him with more means with which to indulge the dreadful craving, and one social historian of that time states that the male population of those early settlers was fast becoming a nation of drunkards. This may be a very pleasant condition for the man, but what about the women and children? They were the principal sufferers, and it is said that the strong womanhood of America stood up like an inspired goddess and declared that this curse of strong drink must cease. All the methods they adopted to achieve their purpose it is not necessary to state, but they were sufficient to obtain their ends, and the America of to-day is a more temperate land than most countries of Europe. In London, the public bars project themselves on the stranger at every turn. In New York they seem to hide shamefacedly and must be sought out to be found.

12. But what about India? It has started on its downward course in the drink habit, and many think that it will slide downwards very rapidly. Can its womanhood deliver it from the dark slough into which it is drifting? Is there any womanhood in India, as understood in western lands? The females of India are generally bound, from the child to the child mother, (a child of twelve is often a mother) and with the peculiar fecundity of the climate, the latter is soon endowed with a numerous progeny. She is a flower crushed before its bloom. Has she any strength to rise to the rescue of the man? Is it not more likely that he will drag her down to the level of his own depravity? The outlook for the India of fifty years hence to some appears dark indeed. Plague has given the country a great set-back. Its social reformers are well meaning, but have as yet achieved very little. To merely

copy the European is not always a reform. India is a distinct entity of its own, and cannot rightly develop on a European model. It seems more prone to copy the evil and to eschew the good that it can get from Europe. As far as the drink habit is concerned, its womankind cannot help it.

13. Europe itself is rapidly changing. The King-Emperor has declared that his health can be drunk as well in water as in wine. The Emperor of Germany, one of the drinking nations of Europe, has openly proclaimed for total abstinence. Cannot England, who has the best interests of its Indian subjects sincerely at heart, treat India, in its Excise System, as a total abstinence country ought to be treated? Cannot alcoholic decoctions of all sorts be barred at all State functions? If the State and its English rulers set a proper example, the Indian subjects will follow as a matter of course. The walnuts and the wine and the speechifying after State dinners, are the only parts of the public entertainment in which the Indian at present joins. Cannot the wine be omitted? The King has declared that his health can be drunk in water. Why then have wine? The Czar of Russia has openly proclaimed that alcohol has added to "THE WEAKNESS, POVERTY AND ECONOMIC DESOLATION" of the Russian people. Some radical change has to be made by the stronger for the sake of the weaker, and the State, at least, can bar all wine drinking at its State functions, and the Native Rulers of India will soon follow this lead.

14. The day when India was held by the sword has for ever passed. When the British Government so far took the Native Rulers of India into its confidence, and induced them to raise and to maintain the reserve of its Indian army, officered by both Natives and English, she, in a manner, handed over the sword to India's keeping. This reserve force is regularly inspected and reported on by England's best Generals, and it is said to have attained a degree of excellence such as the reserve of a great Power

should possess. This force is daily increasing, and, if at any time it should combine with England's standing. Native army, what a strong Indian Military force it will make. Thus the sword has been voluntarily made over to India by the statesmanship of England.

15. As rulers, the native princes of India have gone forward in a very remarkable manner. Some of them have shown special wisdom, enlightenment and enterprise in their rule. Take Mysore as an instance. Would the large English capital required for working the Kolar Gold Mines have been attracted thereto, except by some broad and wise State policy? The harnessing of the Sivasamudram falls of the Cauvery river has been carried out at State expense, with the aid of American and Swiss specialists, and has proved a wonderful success in many ways. The Princes of India, more than any other class, have benefited by the British administration of the country. Most of them have been gently lifted up from a state of ignorant semi-barbarism, and instructed in enlightened modern systems of paternal Government. And, what is more, they understand the people of India better than a foreign Government, and can deal more effectually with them. Other rulers are following the Mysore lead. Mysore is no doubt very thankful to England, from whom she has got her first lessons in enlightened administration. The Mysore Excise System is modelled after the pattern of what is being done in British territory, and this again is an adaption of the Excise System of England, an alcoholic drinking country. Cannot English Statesman introduce into India something suitable to a country the bulk of whose population were total abstainers? May not the importation of all foreign liquor be entirely forbidden? Cannot Government distilleries, and all other distilleries in India be closed, and the breweries, which have been mostly engineered by Europeans, be made to brew non-alcoholic beverages? It is said that in Mysore there was once a very conscientious

English Administrator, Colonel Dobbs, who felt ,responsible to God for the well-being of the people in his charge, and that he succeeded in excluding the Excise Law, and in barring all alcoholic beverages from his portion of the Province, to the supreme well-being of his people. This good officer, though dead, yet speaketh. Cannot his example be followed throughout India? Mysore official records will show how he achieved his purpose.

16. Dr. Johnson said that even a dog will refuse to drink wine, and what is not good for a dog cannot be good for man. India fought its non-alcoholic fight in the pre-historic days, and succeeded. Cannot England allow it to remain in this condition, especially now when the plague scare is driving so many of its sons and daughters to alcohol as their supreme help?

17. Nearly every one is indignant at the doings of the militant suffragette. But there are many good and wise women, who are not militant suffragettes, but who desire the vote, not merely that they may be equal with man; their ambition is of higher order. They know the havoc drink, in many forms, is working in the poorer homes of England, how it is the curse of that fair land, and one of their first acts would be to try to oppose the brewing interests in the House of Commons, and to legislate so as to purge the poorer homes of England from this great evil. And yet here in India, a total abstinence people are being gradually drawn into the vile meshes of the drink habit. If the ancient caste system of India has helped in keeping that country a non-alcoholic one, it will be better to perpetuate this system, with all its defects, than that its gradual neglect, should introduce the silent conversion of India to the drink habits of England and other European countries.

18. In this connection it may not be amiss to repeat what the great Abraham Lincoln said on this subject. He says—"I think that the reasonable men of the world

have long since agreed, that intemperance is one of the greatest of evils among mankind."

19. This chapter may here give an extract from German statistics.—It has been shown that drink in that country causes annually 16,000 suicides, 1,300 accidents, 30,000 cases of delirium tremens and insanity and 180,000 crimes. More than sixty per cent of the insane, fifty-two per cent of the epileptics, forty-six per cent of the criminals, and eighty-two per cent of the immoral women, are reported to have been born of drunken-parents. This has so impressed the mind of the Kaiser who loves his people and feels his responsibility, that it has made him a convert to teetotalism.

20. Germany is an enlightened country compared with India. Those who love India and its people, and who feel their responsibility before God, should realise what a dreadful evil the drink habit is going to be to this sunny land and its countless millions, unless supreme efforts are at once made to effectually stop it, without any regard to loss of Excise Revenue. A happy and prosperous people, are a country's highest and best heritage and everything done in India, its laws and its system of education, should all have the one object of raising the people in Indian lines, and not making them the copy of anything prevailing in Europe or any other country. Learn to know the common people thoroughly, and then do what is best for them as a whole, and not for any one class merely.

21. The last Indian budget (1913) has shown that the Excise Revenue in India has risen from £4,300,000 to £8,200,000. What a total of misery does this mean for many, many Indian families! Cannot England wake up in its moral strength and realise its responsibility? God, in the wisdom of a Providence which often man cannot understand, has given England this ancient land, with a civilization and a history which the modern mind cannot yet comprehend. It has gone through great storms and tempests. Ambitious men in the dim past have pillaged

and plundered it. It has bowed its meek head to the cruel conqueror more than once.

22. Wordsworth states that it required the rattling chains of Roman subjugations, to make the proud Druid accept the humble message of peace, which has now made England great, and she is daily growing greater. Her sons are going forth to the remote corners of the earth and forming new nations, which will soon be even greater than the motherland.

23. But what about India? Remnants of its ancient architecture, and some things in its ancient agriculture, show unmistakeably that it was once great, but it had been robbed, and enslaved, and reduced to a condition when it gladly welcomed the strength and protection and peace of England. What is it receiving which is going to raise and ennoble it throughout all future generations? According to Wordsworth, this was God's purpose in subjugating England to ancient Rome, and God has some wise and good purpose in making India a part of the great British Empire. Not to lower it by the revenue which may be derived from alcoholic drinks, but to raise it, and to endow it with all that is best in the making of a great nation. People from India who visit England are impressed with the way most Englishmen speak their own language, there is so much of provincialism in tone and accent. They come away with the idea that most Englishmen cannot speak their own language correctly. But these same Englishmen know other things which are making England great, and it is these other things, and not the aptitude to speak English grammatically, which India has to learn. This leads on to the next section regarding the teaching young India is now receiving from its great benefactor England.

24. In its heart of hearts the English administration of India is not selfish. There may be individual Englishmen with a disagreeable manner and a great idea of what is due to them as members of the dominant race. But this

kind of conduct may be met even amongst individual Indians, and is not the character of British rule. England sincerely desires to do what is best for its Indian people. But an Anglo-Indian career is so short. Just about the time when, after many mistakes, the people and their wants are properly understood, the career is cut short, and a new race succeeds. Compulsory retirement often seems to be a grievous mistake, for a good man doing a good work should be induced to remain as long as possible in the country. Very often, just when one has come to the period when his work is of most value, forceful retirement awaits him and the mistakes of juniors continue to arrest real progress. One can readily conceive the many difficulties which surround this subject. On the surface, it seems a great pity that just when a person has come to the best years of his working life, and can be of most use to the country, and when the people particularly require a ripe experience and a knowledge of affairs, that the Anglo-Indian's, and even the Indian's career, is suddenly cut short.

25. Some appear to think that the licences to sell liquor should not be put up for competition and given to the highest bidder. This, however, is at least a splendid barometer to show the Government if the drinking habit is increasing or decreasing. If the bid is higher than in the previous year, it will show at once that drinking is going up, and immediate measures should be adopted to prevent this. Others, again, consider that the licencing authority should not be the Collector. The Government is paternal, and should do what is best for its children, and this best is not to drink alcohol in any shape or form. The present Excise system should be taken up root and branch, and all alcoholic manufacture and all importation at once stopped. This may look rather radical, but it is for the people's good, which is the first consideration with a benevolent paternal administration, and the result in the increased happiness and opulence of the people will quickly show itself.

26. In South India the juice, or natural extract, from the numerous kinds of palm trees can be made into a very fine sugar, not unlike the maple sugar of America. In old Hindu and Muhammadan prescriptions for medicines for horses or cattle, if the medicines have to be sweetened, it is always with the palm sugar, and not the cane sugar, so that palm sugar is believed to have therapeutic qualities. Yet this useful economical natural product, under the supervision of the Excise Department, is turned largely into a fermenting intoxicating beverage yielding a large revenue. In speaking to the people who partronise these drinks, they explain that it is good for the human constitution, a sort of natural vegetable milk. If this is the case, would not the sugar have the same effect without the fermenting intoxicant, or the pure juice out of which the sugar is made without the fermentation. To the casual on-looker, it appears as if the maxim is 'drink as much as you like, so long as the Excise Department can report a large revenue to the Government.' Each tree is taxed, and a good revenue derived. If revenue is so great a desideratum, then tax each tree, but insist that the juice is only to be used for making sugar, and must not be fermented as an intoxicant. The tax may be regulated according to the market value of the sugar produced, which may be of much less selling value than the fermenting intoxicant, but this loss can be recouped in many other ways.

SECTION IV

Defects in the Teaching in Primary and Secondary Schools—the Bi-Products of the Plague

FROM the overflowing Excise Revenue caused by the increased drink habit in Bangalore, which was due to the plague scare, the Government have given liberal grants for Education and Sanitation which have thus become bi-products of the plague. This reminds one of an old excise contractor. He distilled spirits for the Government under its supervision and made quite a lot of money by this business. On being questioned as to how an orthodox Hindu could embark on such a trade, he replied that he gave a good deal of his profits away in charity and trusted that this would remove the curses of the drunkards' families and also balance accounts in the next world. So the Government from its overflowing Excise Revenue has made liberal grants for schools and about twenty new school houses are being erected for the poor in different parts of Bangalore.

2. It is trusted that the teaching imparted in the new schools will be for the real good of the people and not the same as that given in the older schools, viz., ability to pass crude examinations in English. If the object of the schools is to impart as much useful knowledge as possible in a limited time, then the present system of primary and secondary education can hardly be considered a success. To first teach children the smatterings of a foreign tongue, which they learn more or less as an effort of memory and cannot quite understand, and then to attempt to impart other information to them through

this non-understandable foreign medium, seems a great loss of time and opportunity. The fertility of the Indian intellect is amazing, and it is wonderful what a lot of information it has picked up even under such discouraging methods.

3. After deciding on the medium through which instruction should be given and which, most people will think, should be the medium by which the most knowledge can be acquired in the shortest time. The next thing to be decided upon should be the nature of the teaching. This, one would suppose, ought to be what will be most useful to the students. To be able to recite whole pages of Milton with a strong Scotch accent can hardly be considered the most useful instruction for an Indian boy; but one has sometimes witnessed this kind of performance as the result of the teaching on the present system.

4. The medium through which an Indian boy can acquire most information in the shortest time will naturally be his own vernacular. Even the three R's can be more easily acquired in this way than through a foreign tongue. If the school aspires to something more than this; then in village schools and in nearly all other schools where most of the children are the sons of agriculturalists elementary teaching on advance agriculture appears the most important. Co-operation, seed farming, poultry farming, dairying, sugar making, and other kindred subjects, would form a most interesting syllabus of useful instruction which the children of agriculturalists would be interested in and absorb even as they take in their native air.

5. To fill their heads with history, poetry, and geography, though these be very fine things to know, will not be of any practical use. It is true that knowledge should be acquired for its own sake and not for every day use, but in a country which has a literature of its own, hoary with age and rich in imagery, and, more than all, something which an Indian can appreciate and enjoy, why go and cram his always acute brain with a literature which

he may learn by rote, but which will not add to the measure of his joy in living. If work for half a day on some practical occupation can be combined with instruction in school for the other half a day, it will make school more pleasant, and give a spirit of self reliance to the lads, which mere cramming all day at school and sometimes homework at nights cannot impart.

6. It is the fashion just now to introduce European sports like cricket, football, etc., into Indian schools. This may be all very well in its way. One is not inclined to join Kipling in designating such things as the sports of "FLANNELED FOOLS." But is it appropriate to the Indian boy? Would he not enjoy very much better a ploughing competition, or a pecottah bailing contest, or other sports which will be sport and practical instruction combined?

7. Life has to be faced, and life is a serious thing—are the teachings in elementary, and even advanced schools, so arranged and regulated that an Indian lad can make the most of his school life? Does it give him the right sort of equipment for what is to follow after he leaves school? Does it make him most useful to himself and to his family and to his country at large? It may qualify him as an aspirant for Government employment! But should that be the object of his teaching? It may have been necessary in the past to supply the Government with a certain number of qualified men to help in the administration and many of these men have achieved greatness. But this would have been increased a hundred fold under a less foreign system. Now when the teaching of the people is gradually assuming national dimensions should not something more than the narrow groove of Government employment be aimed at?

8. The national work and employment in India is not the Government service; but agriculture. Millions of pounds of sugar are being imported into India from other countries. Even a place like Java is said to be

greatly enriching itself by importing sugar into India. Whereas this country, if rightly directed, can, not only raise enough sugar for its own use but can also greatly enrich itself by supplying all Europe. This is only one of many other agricultural occupations where a little teaching will be of the greatest help to the sons of India as a whole.

9. One of the richest and most enterprising ryots in a district was a man who did not know a word of English. Had he some teaching in the vernacular on the many subjects comprised under agriculture he would have become something like our colonial millionaires. Some of the best craftsmen in India were also men who did not know English. If they had to impart their knowledge to others only in English, South India would be considerably poorer under this English barrier. If the craftsmanship of India is losing its ancient reputation the teaching in English is one of the principal causes.

10. The Education of India as modelled by Lord Macauley is out of date and also more or less like what prevails in England; whereas, there cannot be any two countries more dissimilar. England is one of the least agricultural countries in the world. Its old cotters and crafters and other agricultural labourers have emigrated to the colonies to the enrichment of themselves and those new countries and most of its other sons have gone to the manufacturing towns. But India has no colonies and very few manufactories. What are its children to do? Study English for employment in the Government service! There can be nothing more absurd. A naturally prolific country but so dreadfully backward in the things that make for the prosperity of its vast populations!

11. To a stranger, the Italian soil seemed so thoroughly cultivated. A kind of intense cultivation. Even a woman could be seen at the plough. Whereas in England most of the land appeared to be fallow; and yet the system of teaching in this non-agricultural land is being foisted on

India where most of the people live by agriculture. The Italian while intensely cultivating his own country, and making the most of his lands is also emigrating in large numbers. At a place where the writer was staying in America a new railway was being made. A sort of fellow feeling induced him to go out and to have a talk with the American Navvy. But what was his surprise to find that all the earth workers were Italians who could not speak a word of English or American. But poor India cannot emigrate anywhere and, though she has no forced military service, is not making the best use of her wonderfully prolific soil and climate. Italy is importing potatoes into Ceylon, whereas India its neighbour, if properly directed, can supply half a dozen islands like Ceylon. In the new impetus now being given by that energetic officer Sir Harcourt Butler to an almost free and national kind of education in India the real good of the greatest number should have the first consideration.

12. Intense and advanced agriculture, and all the various industries and combinations that should go with agriculture, will be for the best interests of the bulk of the people. To raise sheep, and to export the raw hide to Germany, is to enrich Germany and to impoverish India. To dress and to tan the hide according to the newest methods of tanning and to manufacture it into all kinds of useful goods, which Germany can purchase if she likes, will be to enrich India. And so with every other kind of agricultural product. The sons of India are quick to learn and to master all kinds of intricate machinery and can produce the best kinds of manufactures from their own produce. They did so in the past without machinery and they can do so again with machinery, and India, if properly directed, can eclipse Germany and most of the other lands which have lately risen into industrial importance. And it can learn quickest and best if taught in its own vernacular. Instead of which it is being taught grammatical English and to compete for Government

employment, while the real wealth and greatness of the country is being trampled under foot.

13. The Government have lately formed an Industrial Department. Cannot all primary and secondary school teaching be directed by this Department? It will be more in touch with the larger requirements of the bulk of the people and will know how to meet them. A high academically trained body of men like the officers of the Educational Department may be very good for the High Schools and Colleges but are out of place and out of touch where the large number of village and other primary and secondary schools are concerned. It is like a boy whittling sticks with a golden knife. Their sympathies are with the higher education and with teaching in English and they will try to fit all elementary and secondary students for the high schools and colleges.

14. This may be very good in its way, but what the country really requires are better agriculturalists, a training in advanced commercial and industrial methods, and the fostering and advancement of the old craftsmanship of India. All this can be done best and quickest and cheapest in the people's own vernacular, and by a Department who know the great resources of this varied land, and by men who are not necessarily academically trained. Instruction in the advantages of co-operation which the Indians once understood will be of great benefit to the poorer struggling class of people, and do away with the village sowcar, who has taken the place of the old Pindarie or village plunderer. When his occupation is gone, every ryot will be able to eat the fruit of his own labour in peace and contentment, and will see that it is to his best interest to improve his patch of land to its utmost capacity for the good of himself and family, and not to feed a rapacious sowcar.

15. As for Government loans under the land improvements act, these are too surrounded with red tape and too

much in the hands of Government subordinates who, more often than not are worse than the sowcar.

16. It may be asked why all this tirade about schools when treating of the Plague? Well, as already stated, the present energy in primary education is more or less a bi-product, due to the increase in Excise Revenue, of the plague; and one who has mingled with the Indian Ryots in Floods and Famines and at happier times, and who has had a good deal to do with the Indian craftsman on large city works, feels a tender regard towards them, and would do wrong not to show what he considers to be for their best interests, and the unsuitable teaching now being given them with the best intentions. They are a polite lovable people, but easily influenced for good or otherwise, and one desires with God's help to be of some little service to them in a humble way by pointing out what appears to him to be important for their future welfare. The Government also sincerely wishes to do what is best for its Indian people; and this is an encouragement to those who know them well to respectfully ventilate their views for the information of those in authority.

17. Many years ago, a missionary of some experience was about to open a High School at his Station. He was asked what he proposed to teach and replied, "just the same as the Government High Schools. Why should not our Christian children pass the Government examinations, and obtain Government employment, and become Tahsildars and Magistrates like the Hindus?" And so this High School, which has since become a College, is pouring forth its stream of matriculates and graduates to join the great river of competitors for Government employment. While one or two may succeed, the bulk will be drowned in the sea of disappointment and disqualified for most other work. How can the Government from its attenuated bosom find employment for the annual hordes of passed students? On the other hand the land is being merely scratched, and agriculture, the staple industry of India,

as conducted in other lands is not even understood in this country. Its manufactures and trades, which modern experience has shown can make it rich and great indeed, and in which it once excelled, are languishing and other foreign countries are making India the dumping ground for their inferior goods. When the people are misguided and kept poor, handicrafts cannot exist, and so the old craftsmanship of India is rapidly dying out. All this under the mistaken craze for teaching English and competing for Government employment.

18. Very good material is thus being wasted and the people and country impoverished. It is time to call a halt and a right about in the educational policy of Government.

19. Sir Richard Holmes in his life of King Edward the Seventh refers to the "ACTIVE HINDU AGITATION" against the partition of Bengal and states, "THE APPARENT MOTIVE WAS THE FEAR OF THAT SECTION OF BENGALIS WHO SEEK A LIVELIHOOD AS SERVANTS OF THE GOVERNMENT THAT THEIR CHANCES OF OBTAINING APPOINTMENTS WERE IN DANGER OF BEING DIMINISHED." And how was this agitation met? By cancelling the partition and by raising Bengal into a separate Government with many more official appointments for agitating Bengalis. This is wise policy for the present. But where will it end? Will Briareus with his hundred hands be satisfied for long? According to the old legend will he not try to attack Olympus and to cast the Titans into Tartarus? And yet the Bengali is a docile grateful person. God has endowed him with an acute intellect and the system of Government education has diverted this strong intellect into the narrow groove as a seeker for Government employment; instead of that broader Road the development of the wonderful resources of his great country. If the clever Bengali mind were rightly directed, he could make his beautiful land, extending from the snows of the Himalayas to the Coral sands of Cape Comorin, one of

the principal suppliers of the economic wants of the whole world, instead of being what it now is, the dumping ground for the inferior goods of all foreign nations, while its sons are scramblers for the crumbs that fall from its master's table. Change the system of teaching and then India and her sons will soon take their right places amongst the great nations of the world. As yet the educated class is only as the froth upon the surface. Ninety per cent of India's dumb millions are agriculturalists, and it is these who can be awakened by a correct method and manner of teaching.

SECTION V

The First Rule that Made Fraser Town Plague-Proof

AFTER an interesting digression on the product, and bi-product of the plague, viz., the increased drinking habit, and the excessive Excise Revenue consequent thereby and the additional grants to schools from this increased revenue, the price of the demoralisation of a temperate people as some consider it, it becomes necessary to go back to the original subject of the plague itself, and to try to still further explain the investigations and observations made. Amid scenes of pain and poverty, death and drunkenness, with an evil odour of want and wantonness all around, one went from hovel to hovel in search of the cause of this calamity. As already stated, one prominent fact presented itself in almost every case. Whenever there was continual damp and stagnation in any one place, there were sure to be loud cries and lamentations, the result of the plague visitation. It reminded one of the dreadful days of the big famine of 1877. Whenever the loud growlings of dogs were heard, there was sure to be a dead body which had dropped by the way from disease or starvation. Washings of all kinds in this Indian climate, if not speedily removed, soon form sullage, and where this is constantly soaking into the Bangalore soil, by some unseen chemical action, fermentation is set up and a miasma formed, and the plague let loose on the rats and the people. To those who were watching, where these conditions existed, plague was invariably to be found.

2. This was markedly the case in the poorer over-crowded congested Indian parts of the town. One may consider it the result of insanitary surroundings, and this had something to do with it. But it was also so in other and better favoured places. To take an extreme case in an opposite direction. The Mysore Residency in Bangalore may be considered a place with the most spacious grounds and with the largest open area. Yet, even here, in the servants' quarters, where the washings from several of the servants' godowns discharged into one place, and kept continually soaking into the ground, even there, in the most elect place in Bangalore, the plague intruder showed himself, and the servants were immediately scattered into small separate huts, with large air spaces between them. Whatever may be said of the demon of plague, it must be stated, that he is no respecter of persons. Hovel and palace are alike to him. Wherever certain sanitary laws have been disregarded, there plague life is generated in Bangalore, and the ugly one is an unwelcome visitor.

3. In Bangalore, in the wet weather, when there is most damp about the soil, there is also always most plague. In the hot weather, when there is least damp, the plague disappears. If the rat and the rat-flea were the sole cause of the plague, and nothing else, the plague would continue very much the same all the year through. The rat and the rat-flea do not migrate in the hot weather. In fact, in the summer season when there is less shelter in the open, one would suppose that they would prefer to come into the houses, and yet there is less plague in the hot weather. Rats are said to leave the sinking ship. But Bangalore is not in a sinking condition in the hot weather, it is just the other way. The people eat and drink and sleep more in the open in the hot weather than in the cold, and there is more food thus scattered about to attract the rat.

4. It is said that the plague bacillus cannot stand the

heat, and dies out in the hot weather, and that the rat and rat-flea at that season are therefore not plague-infected and cannot communicate it to man. This may be correct, but does not represent all the facts. The chemical composition of the soil has something to do with the plague for better or worse, for in Calcutta, the plague is worse in the hot season, and less during the rains. How is this explained? Does the chemical action of the wet and damp on the soils of Calcutta dissolve, or set free, certain constituents which are not favourable to the plague bacilli, and probably destroy it? The rat and the rat-flea are very much alike in both Calcutta and in Bangalore. Why then is there more plague in Calcutta in the hot weather and less in the wet weather, and just the opposite in Bangalore? What can be the reason? The plague demon, unlike some men, is not accustomed to make a volte face like this for nothing. There is a reason for its action. It is the result of something beyond and behind the rat and the rat-flea, and that something is the composition of the soil, which, in some cases, is the mother and originator of the plague, and in other cases its destruction. It may be asked how then did the plague come into Calcutta, and how has it retained a hold in that city, when the soil of the place is against it? If the constituents composing the soil, can be kept damp and moist all the year through, then probably plague can be extirpated from that town. The chemical action of damp on the soil in that place, unlike Bangalore, is against the plague bacilli. Calcutta is a great centre of trade and commerce, and the plague germ must have been introduced from infected places. May be the rat and the rat-flea were brought in there in this way? But its effect on that city, unlike Bangalore, has been checked by the chemical action of wet and damp on its soil.

5. These remarks are intended to call the attention of the scientific investigators of the plague bacilli, to an examination of the composition of the soils in different

parts of India, if they have not done so already, as this has an important bearing on the severity or otherwise of the plague in different places.

6. The ancient city of Madras may be mentioned as a further illustration of this contention. The plague regulations were very carefully drawn up in that City, and still more carefully and rigidly carried out. But Madras is a great centre of trade and commerce, and the plague regulations do not insist on the examination of every bag of grain and other things imported into it from plague-infected places. People were examined, but not material, so that the plague microbe must have been introduced into Madras continually from plague-infected places, and yet Madras has remained immune from plague through all these years. It is known that plague-infected people have gone into Madras and died there of plague, and yet it has not spread—Other towns of less commercial importance, have had plague regulations as carefully considered as those of Madras, and as carefully and rigidly administered, and yet plague has entered those towns and done no end of harm, though the towns were of less commercial importance, and there was less danger of becoming plague-infected through trade and commerce. Madras cannot be considered a sanitary model of a city, while it has the stagnant Cooum, a huge sewer in its midst, and with its congested and filthy places like Chintadripet and Triplicane. Madras may be considered a very insanitary town, and yet it has been free from plague. What is the reason? It has the rat and the rat-flea, if anything worse than most other towns, and yet the plague demon has not harmed a hair of the heads of any of its dirtiest people, living in the most insanitary places, with open gutters, and filthy surroundings all about. Are the people of Madras better than those living in other places? Has their righteousness protected them? The police records do not substantiate this. What then is the reason that the plague has not located itself there? Those who know

Madras well can explain this. The drainage into its Nallah and water courses brings muddy silt with it. Has this been examined ? Those who know Madras intimately, state that if this were carefully examined, it would be found impregnated with sulphur, and that it is the sulphur in the soil of Madras which has protected it all these years from the assaults of the plague enemy, which has been knocking in vain at its gates.

7. On a comparison between Bangalore, Calcutta and Madras, it has been demonstrated that though the rat and the rat-flea are the same in all these places, yet the plague is very different. In Bangalore it is most severe in the wet damp season. In Calcutta it almost disappears in the wet months, and is worst in the hot season. In Madras it is not known at all during the hot or dry seasons. This shows that the plague in these places is not due to the rat which is the same in all the places. It is due to something else, and that something is the soil. Experiments should be made with the soil in each place and the underlying facts and causes discovered. The rat and rat-flea are contributing causes, and channels of communication, and a merciful provision of Providence that man may know by the dead rat, that he has to arm himself against the plague fiend. How many have escaped from the plague by the warning of the dead rat! And how many who did not heed the warning have died !

8. In Bangalore, by close observation, it was found beyond doubt that continual damp and soakage into the soil let loose certain constituents in the same which formed, or stimulated plague and, that to remove or to avoid this evil, the first and best thing was good drainage. As soon as this was known, Mr. Harris, the President of the Corporation, adopted measures to at once drain the worst portions of the Native town. He very wisely treated the matter as urgent, shouldered the responsibility, and started a cheap but effective drainage of the parts of the town where plague was worst. This prompt

action had an immediate effect on the ravages of the plague in those localities, and it is believed that many hundreds of precious lives were saved thereby. To have prepared a regular drainage scheme on the most advanced system, and to have obtained regular sanction from the Corporation, would have taken time, and where the lives of the people were at stake, there was no time to be lost, so that Mr. Harris' prompt action in this matter cannot be too highly commended. It was not talk and red tape that were needed, but ready action, and help for the common people, at the time of their greatest need. And the effect was quick and apparent. It showed itself by a sudden drop in the plague in the area drained. On one occasion a bad part of Shoolay was drained and its effect watched. The plague there had ceased, but intimation was brought of one case in one of the houses drained, and this house was carefully examined. It was a tenement house, with a number of rooms surrounding an open courtyard. All the rooms and courtyard had been properly drained, and this drainage passed under one room to the public drain outside. This portion of the drain, under the room was clogged, and the sullage had lodged here and soaked into its surroundings, and the case of plague was in this room, caused by the clogging of the drain. Observations like this all over the town showed without doubt that bad drainage and soakage of even clean water into the soil of Bangalore caused plague.

9. This experience led up to the first and most important rule observed in making the new Extension or Fraser Town a "Plague-proof town," viz., that it must be under all circumstances quickly drained and kept quite dry. That it should not be possible for it to keep damp even during the wettest season. To securely effect this, *all its principal roads were countersunk about 1½ foot below the surface of the natural soil* and the side drains placed about 1½ foot below the lowest part of the roads. The result of this arrangement was to convert the building

sites on either side of the roads, into *elevated natural platforms*, a kind of hill tops, when compared with the lower countersunk roads and drains, and from such places rain water flows away very quickly and damp is thereby effectually excluded. When damp is excluded, plague loses its primal cause and origin, and the town becomes plague-proof, though the rat may not be excluded. The explanations regarding the effect of damp on the soil in Bangalore, and the way the soil does influence plague, were necessary to elucidate the necessity of this rule. It has tended, together with the other rules which will be explained, to make Fraser Town plague-proof, and the expectations regarding it have been fully realised.

10. If circumstances should so conspire that a sack full of plague rats or plague fleas were to be suddenly let loose in Fraser Town, to fasten on each person living there, they may all get the plague, and may even all die, but the plague will also die with them, because there is nothing in the conditions of the town to sustain it. In this way Fraser Town is plague-proof, and the first and most important reason is that it is designed as a dry and well-drained town. The same rule may not apply to other towns, not to Calcutta for instance. It will depend on the chemical composition of the soil, and on the effect of damp thereon, whether damp will generate the plague as at Bangalore, or will destroy it as at Calcutta. Observation and experiments can alone decide this.

11. But from observations made in Bangalore, there is every presumption that the condition and chemical composition of its soil, has some marked effect in the generation of the plague bacilli, and in the construction of Fraser Town, the correctness of the observations were put to practical proof and were confirmed. The other rules which contributed towards making Fraser Town, both healthy and plague-proof, will be explained in the next chapter.

12. There is one other little matter which should be

noticed. The site of Fraser Town has a very good longitudinal fall. About two feet of the upper soil is a more or less loose loam. Below this is a bed of gravel. The surface drainage cannot very easily penetrate through the harder gravel below, and so runs longitudinally through the upper more-porous soil. When this meets with an obstruction like a building, the capillary effect is to make it rise through the walls of the building, and to make the floors damp. The countersinking of the roads prevents this effect, and it was further lessened by making all the longer axes of the buildings, that is their longer dimensions, parallel with the slope of the ground, so that the building might present a minimum obstruction to natural drainage passing through the upper soil. This may appear a very little matter, but it is attention to minutiæ that contributes to the success of an undertaking.

SECTION VI

An Explanation of the Second, Third, Fourth and Fifth Plague-Proof Rules

THE second rule, viz., *the building of all basements to be of stone and about 1½ foot high with good cement pointing of the joints*, is an easily understood one, and requires no previous explanation. This will lead to the complete dryness of the house. The countersinking of the roads keeps the grounds below and around the house quite dry. The raising of the basements of the houses and building them of stone will add to the dryness of the houses. Bangalore has a small rainfall and fine natural slopes, yet it is surprising how sodden and unhealthy an undrained area may become. This raising of the basement 1½ foot high, building it with the splendid granite rubble for which Bangalore is noted, and pointing the joints with good cement, it is trusted will also keep rats and other vermin from burrowing into the basement walls, and will make it more difficult for them to enter a house; the place will thus be defended from damp from below, and from vermin around, a sort of fortified house.

2. Stones are cheap in Bangalore, so that it was not a great hardship on the builders to carry out this rule, though some often tried to reduce the full height of 1½ foot. The native, as a rule, does not care for a high basement. It disagrees with his conventional ideas of privacy. The whole object in the construction of Fraser Town was to elevate the common people and to accustom them to a newer and more healthy manner of living without adding materially to the cost of the house. In all these rules one

FRASER TOWN
View of a Block of Buildings in Erection.

had not to forget that the buildings were intended primarily for the poorer classes, so that every rupee added to the cost, meant taking it further out of the reach of the poor man. On the other hand, it had to be commercially successful. The capitalists who were induced to build, were good and philanthropic gentlemen, who were prompted with a most sincere desire to help their poorer brethren. But those who were urging and encouraging them into this business, felt responsible that they should get their five per cent in rent for the funds invested, so that great wariness was necessary in building for the poorer classes. To build sanitarily and in a plague-proof manner, and yet to see that the very good capitalists who risked a great deal of money on this new town got back a fair return for the money expended; these three interests, the poor man, the kindly capitalist, and a fair return for all money invested, had to be carefully considered, not by the good men who were literally pouring out their wealth on this new venture, but by those who were behind them.

3. Some may say, why not have made the basement 3 or 4 feet high? Yes, this may have been sanitarily better than $1\frac{1}{2}$ foot, but some one was bound to be the loser thereby. One capitalist who built more houses than any other, did make his basements 3 feet high, and was prepared to face the loss in rental caused thereby. The houses should not be taken out of the reach of the poor man, and if rented below their money value, the capitalist would lose. A medium course had therefore to be considered and a height of $1\frac{1}{2}$ foot was adopted as sufficient for sanitary purposes and also as not making the house too expensive for the poor man, by this the kindly and good capitalists would not lose financially, though it is believed that many were willing to forego a suitable return for their investment in a laudable desire to help the poor. This sentiment though very good and much to be praised was not sound business. It was from the first the desire of those who were initiating this improvement that it

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should be run on sound business lines, and yet be a sanitary model and a plague-proof town.

4. The third rule was that *all floors were to be of stone slabs or of tiles or of some other hard material,* which a rat could not burrow a hole through or vermin of any kind find a ready lodgement in. This rule many builders considered rather a hardship. The orthodox Hindu considers that a best floor is one smeared with cow-dung. This does look a dirty habit, but it is hoary with Hindu tradition, and to be in sympathy with the people one had to look at things with Hindu eyes and yet by kindness to lead them to better things; so it was difficult to get stone or tiled floors put down which the owners asserted would be smeared with cow-dung. Some said that the best vermin destroyer was the cow-dung smear. That the Hindu sages understood its virtues, and that it was almost a part of the Hindu religion, and a sort of offering to the sacred deity of the cow, to smear its litter over the floors of a house. Such arguments seemed unanswerable. And yet it was pointed out that the dung smear did not keep out the plague microbe, that those who used the orthodox daily dung wash, died as much by the plague as those who did not use this wash, that the English people who looked with loathing on this dirty habit, were those who were almost entirely exempt from the plague, and that in the building of this new town a conflict was being waged with the plague fiend, not for the benefit of the English, but almost entirely in the interests of the poorer Hindu and the Muhammadan, and so almost against their religious convictions, and their better judgment. About 75 per cent of the buildings in Fraser Town were floored with stone or tiles or cement and made rat proof and vermin proof.

5. The holy Brahmin is said to be twice born. Once from the face of Brahma and once again from the belly of the cow; he cannot be holy without this second birth. How the cow came to be associated with this second

birth, those skilled in ancient mythological lore may be able to explain; the legends of Greece and Rome are modern when compared with those of India. This is mentioned to show how much the orthodox Hindu had to surrender when he agreed to give up the mud floor and the cow-dung smear for the more modern stone and tiled floor in buildings intended principally for Indians. One good thing the plague has done; it has shaken the faith of the Hindu in his ancient semi-religious habits of the past and in the barbaric mandarams or incantations which were said to cure disease; and it has reconciled him a little more to modern methods of living and healing disease.

6. As already stated, about 75 per cent of the new buildings had rat proof and vermin proof floors. Bazaars had to be erected in many places. Both the Hindu and the Muhammadan showed keen commercial instincts, and it required some effort to restrain the desire to erect bazaars in preference to houses. It was wished to confine all the bazaars in one place on the open courtyard system; or a modification of the arcade systems of Europe and America, but the Executive had to give way to the wishes of the people in this respect and to locate the bazaars at convenient places in almost every street. It was insisted that all bazaars should not only have good stone floors, but also have stone skirtings all around the interiors of each room and store and this was carefully carried out.

7. The first three rules have now been considered in the making of a plague-proof town in Bangalore, viz., to countersink the roads about $1\frac{1}{2}$ foot below the level of the natural soil, and to thus elevate the building sites on the sides of the road into natural platforms. Second, basements of buildings to be of stone cement pointed and about $1\frac{1}{2}$ foot above the natural ground level. Third, stone or tiled or cemented floors, vermin proof through which rats could not burrow. The fourth rule requires some little preparatory explanation. The land in Fraser Town was divided into one-acre plots, and each acre into 20 building

sites for small houses for the poorer classes of people, and into 10 parts for those a little better off, i.e., 2,178 sq. feet for the smaller houses and 4,356 sq. feet for the larger ones. Out of this area, only $\frac{1}{3}$ was to be built on, and $\frac{2}{3}$ kept as an open space all around the house. For the smaller houses therefore 726 feet would be building, and 1,452 open area all around. In the larger houses 1,452 sq. feet would be building, and 2,904 sq. feet open area all around. So that both the smaller and the larger houses would all be surrounded by an open space. The area for building may appear rather small when compared with European standards, but it must be recollected that these houses were primarily intended for the poorer class of people living in the congested areas. They are there contented with one or two rooms of about 15 x 10 sq. feet each, and sometimes two families would occupy this space. The areas given to these new houses were decided on after carefully measuring up the spaces actually occupied by the poor in the congested parts of the town.

8. It should also be remembered that the climate in Bangalore is very temperate and that an Indian family spends most of its time out of doors. The open area around each house besides being very sanitary will allow of this healthy out of door life with a certain amount of privacy. In modern times, when garden cities in England and Europe, and College settlements in America, are all being designed with open areas around each house this would be considered an ordinary sanitary improvement, and it may be asked how it helps to make a house plague-proof.

9. To explain this, things that actually occurred during the plague epidemic will have to be mentioned. During one of the first severe outbursts of the plague the golla street of Ulsoor, where the milkmen live, suffered very badly. It was then noticed that the plague spread very quickly from house to house, but only on one side of the street. The houses abutted on each other, and all the houses on one side of the street had the plague very badly, but not one

house on the other side. It looked as if the plague microbe or miasma followed the line of least resistance, which was the abutting house. Had the people not been removed *enbloc*, it would have gone to the other side of the street also, but up to the time of their removal it had not crossed the street, and from this incident, it was presumed that an open area all around each house would not only be a general sanitary improvement but that it would also contribute to making that house plague-proof. So, that the fourth rule in Fraser Town to make it plague-proof, was *that only $\frac{1}{3}$ of a building plot should be built on, and $\frac{2}{3}$ should be kept as an open area all around the building.*

10. Besides being plague-proof, this marked a great improvement in the general conditions of Indian life. It is no more necessary for little children in that place to play out in the streets or in the gutters. They had their own yards. And this habit of living safely out in the open most of the day will have a very great effect in the improvement of the general health of the children. The advantages of the open-air treatment are now everywhere admitted and the children of Fraser Town can have it all the time. Land in Bangalore is so cheap that it does not increase the cost of a house very much to have a strip of open ground all around it. Most of the land on Fraser Town was acquired at a cost of less than Rs. 200 per acre, or Rs. 10 per building plot, and considering the advantages in so many ways of this little open area around a house, it would have been most unwise to have built on the old system of one house abutting on the other. Independent of the plague, in the usual infantile diseases, like measles, whooping cough, mumps, etc., contagion is confined and limited by one house being isolated from the other, and the general health of the whole town improved thereby.

11. In carrying this out in actual practice there was some difficulty. Some of the purchasers of plots of lands did not understand why they should not cover it entirely with building. The land was theirs, and they felt that they

had a right to build over it all. The rule first started was $\frac{1}{4}$ building, and $\frac{3}{4}$ open area, but on the contentions of some of the people, the building area was increased to $\frac{1}{3}$ and the open area decreased to $\frac{2}{3}$. All the time work was going on, from the beginning of the planning to the completion of the building, a very watchful eye had to be kept open to see that this rule was strictly enforced. And this watchfulness will have to be continued, for even now addition will be slyly made by some; if it can be done with impunity. On several occasions additions not shown on the sanctioned plans, or other alterations increasing the areas of the construction, had to be reluctantly removed. The advantages of this new method of arranging small buildings is freely admitted, and the craving of adding one small godown, or a dog house, or fowl house, should be resisted, for the dog or fowl house can be speedily enlarged into something else. Blackpally and the other congested native portions of the town, from old plans, were less crowded at one time; but as families increased additions were slyly made often with the secret assent of subordinate officials; and this will be repeated in Fraser Town if the utmost systematic vigilance is not adopted and strict penalties enforced.

12. Every room in a house had windows or ventilators opening into the external air, but windows and ventilators are easily closed. This was found to be the case in Blackpally and the other congested parts of the town. The tenement or other houses had a liberal supply of windows, as probably enforced by the Health Department but all these were kept carefully and securely closed, and in many cases were quite covered with cobwebs showing that they were not even occasionally opened. Some better method of ventilation had therefore to be considered. Something that would be beyond the power of the people in the house to close or adjust, and also something that would afford continual ventilation both day and night, and yet not cause draughts. The plague microbe,

like the poor in the congested areas does not like ventilation.

13. This led up to the 5th and last plague-proof rule, viz., *that all roofs should be of the Mangalore tile.* A potters' village was quite near to Fraser Town and the usual country tiles could be got there both easily and cheaply, but they were carefully excluded, and only the more expensive Mangalore tile insisted on, and every house in Fraser Town is roofed with this tile. It may be mentioned that what is called the Mangalore tile, is of the old Roman pattern introduced into this country by the Germans. It is a water-proof tile, but is not air-proof. It is an interlocking tile and all its joints are open. No cement or mortar is used in its setting and not even nails. The air passes freely through the open joints, and gives continual ventilation both day and night without causing draughts. The vitiated air of the room also passes freely out. The people in the house cannot close these joints, they are too minute; and yet not so small but that heaven's sweet etherial air can pass freely through them from one side of the roof according to the direction of the wind; and the internal vitiated air can pass out through the open joints on the other side of the roof. And thus a room is kept splendidly and continually ventilated in an almost natural manner.

14. Its effect as a good ventilating tile was illustrated during the early days. After a certain number of houses were completed in Fraser Town, permission was given to begin demolishing in the congested part of Blackpally. Rao Bahadur Annaswami Mudaliar, C.I.E., very kindly allowed the people thus evicted to live in his new houses in Fraser Town free of rent for 6 months. They seemed very happy in these new and clean houses, but after a few weeks complained of jaw ache and face ache caused by the wind. They stated that though all the doors and windows were closed the wind yet somehow came into the houses and gave them these aches. This showed that

the tiles in the roof were doing their proper work in the way of ventilation, and very soon the people from dark and ill-ventilated Blackpally got accustomed to this new and healthy way of living. Other illustrations of the strong roof ventilating properties of these tiles can be mentioned, but enough has been stated to show that they contributed in making the houses in Fraser Town well ventilated, and therefore sanitary and healthy and plague-proof. Also they are so formed that they afford no lodgement to mice or other vermin.

15. The five rules which made Fraser Town plague-proof may now be recapitulated. *First* and most important in Bangalore is the countersinking of the roads. *Second*—Raised basements of stones pointed and grouted with cement. *Third*—Stone or tiled floors. *Fourth*—Open spaces around each building and *Fifth*—Mangalore tiled roofs to the exclusion of country tiles and terracing. These rules also make it the most sanitarily erected town in all India.

16. In the next section, a further reference to another aspect of the plague will be considered. For the plague has more than one indirect contributing cause. It is one of those diseases which calls aloud for both sanitary and social reform, for a regeneration of old ideas and old methods of living and even dressing, and amongst the most important of these is better housing and furnishing; and this cannot be attained without better economic conditions, ability to earn larger incomes, and thus to obtain what some consider sanitary luxuries, all of which are more or less anti-plague provisions. In parts of Asiatic Russia, there is always more or less plague, and there the economic conditions of the people are most backward. Germany must be given credit for the wonderful way in which its economic and commercial conditions have improved in the last 25 years. It has made that people great and rich at the expense of most other nations. This in spite of compulsory Military Service.

Cannot India with its enlightened Indian Princes try in some measure to imitate Germany? With its hoarded wealth, no compulsory military service of any kind, and with the peculiar natural aptitude of its people it ought to progress economically; sanitary improvement will naturally follow and plague which now appears a permanent institution, will say its last good-bye to India for ever.

17. In holding up Germany as an example to India, it must be clearly understood that only the wonderful improvements in its economic conditions are referred to. Its commercial expansion is only a natural complement to this condition. Both have to progress simultaneously, or there will be no outlet for the manufactures due to its economic advancement. While these improvements can be held up before India for imitation, the action of the rulers of that great country should also be mentioned as a warning to the leaders of India. The German himself when not intoxicated with military pride is a good fellow, a patient, plodding and provident person. But his rulers have drunk their inspiration from another spring to the undoing of a splendid people. In trying to make their country a great military infernal machine to satisfy political ambitions they have destroyed the fruits of a nation's industry. Intoxicated with the national wealth this plodding intelligent industry was producing, they projected and planned out great political ambitions to the undoing of the splendid race committed to their care, and soon the tramp of millions of feet from India and Egypt and South Africa and Canada and Australia and the Islands of the sea will be heard in the streets and towns of Germany, to the paralysis of great economic industries. It is trusted that India will rush in to fill up the industrial vacuum caused by this great paralysis, and that the leaders of India will take warning from the failure of the political ambitions of the leaders of the German nation to curb political ambitions, and to use all their energies in developing economic conditions, and in raising the status of living in the whole of the

Indian nation; better housing, better furnishing, better food, and improved sanitary surroundings in all the avenues of life. Then only will the plague be conquered, and plague conditions cease to exist in all this fair land. The present dreadful results of the Political Ambitions of the leaders of Germany should cry aloud to all the educated leaders of India to shun politics in all form and shape, as it is not possible to state into what dire pitfalls it may lead an advancing nation.

18. An Indian Expeditionary Force is now on its way to Europe. A somewhat similar army left Europe many centuries ago with Peter the Hermit for the East. This army failed in its main object of delivering the Holy Land from the Saracens, but it returned to Europe with other precious knowledge which has enriched European life ever since. It is trusted that the Indian force after helping to subjugate Germany will also return with other wisdom which will enrich and elevate all Indian life, and raise the Indian army above the level of the old sepoy lines. This will be a better achievement and do more permanent good to the whole of India than the military help it will have afforded to the British Empire; and anything which tends to elevate the Indian people will be a plague prevention.

SECTION VII

Some Plague Experiences and Deductions Therefrom

THE rat, rightly or wrongly, is associated with insanitary surroundings and thus in a manner fits in with the plague. At best it is a child of the soil and abounds in filthy and neglected localities, and in most things that are vile and objectionable. Its connection with the plague is therefore not surprising.

2. But it is different with the squirrel. It is a thing of beauty, a child of the light and of the air. The squirrel is associated with gardens and orchards and trees and everything that is pleasant. It lives on nuts and fruits and is formed by nature to be clean and undefiled; and not to tread the earth but to walk along arboreal paths. Its call to its mate is the music of the garden and more cheerful than the song of birds. It avoids the congested native portions of the town, and abjures all filthy surroundings. Its nest and its home is on the trees. It nurtures its young away from the maddening crowds and seems to court the winds and the storms. It is the antithesis of the rat in its ways and manner of living, and in the kindly feelings it awakens in the human breast. It can be tamed, and becomes a great pet.

3. Yet it is a rodent, and by something in its nature is subject to the plague just as the rats are.

4. How does this beautiful open air creature contract the plague. Not through the flea. Though very agile and springy, the flea laden with the plague microbe can hardly spring to the tops of trees. The rat and squirrel may

infect the flea, and thus propagate the disease among men. But how are they infected in the first place?

5. Damp on the Bangalore soil causes fermentations and chemical changes which seem to originate an undefinable something, doubtless microbic, which is attracted to rodents of all description. Some thing with probably a visvina, a kinetic energy, which drives it down to the rat hole and there infects the rat, and the sickened creature surprised and agitated reaches the upper surface to die there, and by its infected fleas spread the disease to man. Sometimes the rat dies in its burrow, but in most cases with its nose upwards. The same energy or attractive power which appears to drive this something down the rat hole to affect the rat, seems to draw it upwards to the tree tops to fasten its stings of death on the lively squirrel which may also contract the disease on the surface of the ground, or it may be by both. The rodent appears to act like a magnet to this undefined something, gaseous or molecular, this minute microbe which is infecting the rodent and causing the plague in Bangalore. To kill the rat, and to drown or destroy the rat-flea, is not enough. It may mitigate, but will not extirpate the plague germ.

6. In constructing Fraser Town an original and effectual method was adopted, as already explained, by which damp and fermentation are prevented. It has shown good results, over and over again plague was introduced into the little town from the surrounding places, and the patients even died there, but that was all. Whenever there is plague about, a rush is made to Fraser Town and the germs of the disease carried in there, the infected may develop the disease but it dies with them. Plague has been proved not to be infectious and Fraser Town has substantiated this fact, for those who have taken the plague in there have not been able to infect the place.

7. It is claimed that having succeeded in keeping the place dry, was, as far as the Bangalore soil is concerned, the same as keeping it plague-proof. But there are places

in Bangalore which cannot be kept dry. What about them? Have the plague experts any suggestions to offer; except the killing off of the rats and the rat-fleas?

8. May one who only claims to have a very intimate experimental acquaintance with the plague, make so bold as to offer suggestions, one who is not a scientist, but who has merely looked about and observed? It has been already stated that Madras is free from the plague through some composition in its soil. Like Fraser Town, plague has often entered there from outside and plague patients have also died there; and yet the town is free of the plague. The germ cannot live there. It is a flat badly drained place. Its want of drainage, unlike Bangalore, has probably been its best plague-proof protection. It has been surmised that the soil is impregnated with sulphur; and crude sulphur is stated to contain an infinitely small proportion of arsenic as an impurity, so small as not to do harm, and yet probably sufficient to kill the plague germ or to prevent its growth.

9. Cannot the damp places of Bangalore and other places like Bangalore, be artificially saturated or impregnated with crude sulphur or sulphur mixed with carbon or lime, or other things which chemists will understand, in an unexpensive way. Skilled and careful scientists will know how this should be done. Many experiments will have to be made and of different kinds with different sorts of soils. Chemical knowledge and experiment will solve the problem, and the plague can be met in its own den and destroyed there before it has a chance of infecting the rodent. The rat may die, and probably will not be missed if it ends there, but not so the little Indian squirrel; the lively beam of light in the Indian garden.

10. In the grounds of the Mayo Hall, far away from the native quarters of the town and beyond all congestion, stands a huge solitary Ficus tree, the home of many beautiful fascinating squirrels. The tree stands far away from the habitations of men, the nearest house being the Engi-

neer's Office where people work only during the day and which remains empty at night. During the first great epidemics of plague in Bangalore, though this grand old Ficus is solitary and alone, yet the plague somehow found its way there and the pretty little squirrels died.

11. One little fellow made use of the parachute qualities with which nature has endowed them and whether in mute appeal for help, or in mute warning, fell at the Engineer's feet and died there. About the same time one of the men in that office contracted plague and died. How came the plague in this open place. The man may have been infected in his own house or in the congested native part of the town or from the flea of the squirrel, but how came the squirrel with its open air manner of living to be plague affected in this open space?

12. What is going to be now stated may appear absurd to some, but it is mentioned in good faith, and as the result of repeated observation, and is not a haphazard opinion, viz., the peculiar travelling propensity of the plague germ. As already observed, the plague in Bangalore, is believed to originate from the fermentation due to the chemical action of damp and stagnation on the Bangalore soil. This fermentation gives rise to some form of invisible life, and this nameless something, is endowed with the power of travel and invisible motion, whether this motion be caused by something within or outside the object itself, the motion is a reality and can be seen by the sort of pathway it forms in the dead rats and mice and squirrels along its route.

13. It is not merely in congested insanitary localities, but right out in the open from one congested place to the other it has been observed more than once and the pathway followed. It does not travel very quickly, but deliberately and fatally. In the healthier open localities, except smiting the vermin already mentioned, it does little or no harm, but works havoc in the congested places, where sanitary laws have been violated, and the

ordinary rules of public and private health neglected. Its wrath extends from the vermin to the people and immediate evacuation and a thorough cleaning are found the best remedies. This travelling propensity of the plague germ may account for the plague in the solitary Ficus tree in the compound of the Mayo Hall.

14. Another experiment is suggested. Cannot a lot of sullage be allowed to soak in any one place in Bangalore and rats in a wire cage located near by? In time the fermentation from the soil, will probably form that something and develop plague in those rats. A similar experiment may be conducted in another place, and some crude powdered sulphur, or some other simple and inexpensive substance added to the soil, and it may be observed how a set of caged rats will fare in this place. To rest satisfied with the rat and the flea as causes of the plague is not enough. The plague life is behind and beyond them and its cause and origin have yet to be discovered. In the olden days, during the plague in London, meat was said to have been hung out in the open air and to become quickly putrid by the action of the plague life in the air.

15. The freedom of Madras from the plague infection is a sort of index finger showing that the large city, by no means of sanitary perfection as malaria and cholera hassars indicate, can yet by some means be kept plague-proof. Its best friends will not state that its plague regulations have accomplished this. To claim this will be to blame other towns, which had regulations strictly administered. Towns not so much exposed to infection as a large trade centre like Madras, and where yet plague entered and abode and carried away its hundreds of victims.

16. Some may say, if plague attacks vermin in open grounds just as it does those in the congested native localities, why then do not the English people die just as the natives? They would if the infected rats and squirrels were allowed to enter their houses and to die there, and

the plague infected fleas were allowed to nest on the floors and to crawl about on the inmates.

17. One English girl who had a pet squirrel, and nursed it during its illness, not knowing that it was suffering from the plague caught the infection very badly. Another English girl slept and studied in an almost rat proof room with a good basement and a stone floor. But not far from the outer entrance to the room was a mud compound wall riddled with rat holes. The rats evidently had free access into the room and she contracted the plague though the house was one with a large compound. The rat and the rat-flea are no doubt the channels of communication by which humans get the infection, but the root cause and real origin of the disease are beyond the rat and the rat-flea, and all human efforts should be directed to ascertaining and to removing this. Another remarkable peculiarity about the plague is that it frequently shows itself in the same house. After the first attack the house is evacuated and thoroughly disinfected and cleaned and rat holes closed, and yet in the next year's outbreak of plague it shows itself again in the same house. If the occupants changed their habits and prevented stagnation of washings in the backyard this would probably not occur.

18. If the five rules already mentioned and explained are carefully noted it will be found that besides being intended to make the place plague-proof, which they have done, they are all rules which will make the place up to date sanitarily according to the newest methods now in operation in different parts of the world. This, combined with the fine situation, has made Fraser Town not only a plague-proof town but also a health resort; and many convalescents suffering from different forms of disease have resorted there from distant places; and after a residence for a few months have been greatly restored to health and vigour. The best and highest good it has done, and is doing, is that it is teaching the poorer classes of Hindus and Muhammadans a new method of living. It is a

great improvement for these people to live in well ventilated houses with open areas all around them. It is against all their old ideas of living hudled up together. In the olden days when the Pindari was about, and the robber chief and the village gang of free-booters, and when life and property were unsafe it was necessary for their own safety for people to live very closely together and thus to secure each others protection. But those days are now happily past, there is security everywhere, and Fraser Town is teaching the poorer classes of people that they can live safely and securely apart from each other. As already stated the liberal ventilation provided was too much for the first batch of people removed from the congested areas to Fraser Town; but they are now becoming accustomed to these better and more sanitary conditions of living. It is not necessary for children in Fraser Town when out of the house to play in the streets and in the gutters. They can toddle about in their own yards in health and safety, and when it is considered how much of Indian life is spent out of doors, it will be understood how beneficial the little open spaces around the houses are to the health of the little children of that place. These youngsters will grow up strong and healthy and will form the beginning of a stronger and better race of men and women. In this and in other respects, Fraser Town will become, and is becoming, a model for improvement in the housing conditions of Indian life; and when improvements start in one line of life, they do not generally end there. Social reformers are generally content with talking and advising; but in Fraser Town a large reform is practically carried out and the people are learning to appreciate and to enjoy it. The children of that place will never go back to the old congested ill-ventilated houses of their forefathers. It is raising the Indian man and woman from the native parcherry and practically setting them abreast with more advanced civilizations; and all this together with making the place plague-proof.

19. The remarks made about the plague, its origin, and its ways it may again be stated, are those of a very ordinary person who claims no special scientific knowledge, but who has gone in and amongst the afflicted poor with a great longing and desire with God's help to be of some practical use to them; and the rules on which Fraser Town has been built are the result.

20. He finds fault with no one and is very thankful to the Hon'ble Mr. Stuart Fraser and to others who gave him the opportunity of putting these rules into practical shape and the test of time has been in their favour.

21. The fire of London is believed to have extinguished the plague in that place, but those who kept a careful record state that it lingered on for seventy years longer. It was up-hill work but finally it was cast out root and branch from that fair land with the hope and expectation that it will never return again. The improvement in the economic conditions of England and in the better housing which resulted therefrom was one great contributing cause, and so it will be in India. The poorer class of people, the bulk of India's millions of population, must be lifted up. They are now in the mire and the dirt of ignorance of the simplest sanitary rules. It is not necessary to remove them from their present humble occupation but to improve the economic conditions; and thus to improve the people themselves. The teaching of English, a foreign language, is not necessary in this titanic work; on the contrary it is in a way hindering it. The people should be instructed in their own language, in their own villages.

22. There should be a sort of new educational mass movement, in which the improvement of the economic conditions of the whole of India should be aimed at. A good deal of preliminary translation work will be necessary but there are large numbers of English taught young men simply wasting for want of occupation who can be employed on this preliminary business, and can become heralds in this new manner of teaching. When economic

conditions are improved, and a new era of wealth and prosperity dawns on India, its sanitary methods of living will also improve, and plague will find its occupation gone and will finally disappear for ever from the face of India; and the weeping and the wailings it has caused will only be remembered as a bad dream of the night.

SECTION VIII

Describes How Congestion was Relieved in the worst Overcrowded Localities

A REFERENCE to the plague should not be concluded without explaining the original way in which the very congested Indian portions of Bangalore were opened out. In doing this the old history of the Province of Mysore will have to be briefly considered.

2. In the olden days, before the British or Muhammadan conquest of Mysore and while it was governed by its ancient Hindu Rajas, large parts of the Province were divided up amongst a number of Poligars or petty Chiefs. Each chief had his fortress, dominated a number of fertile villages, and rendered Military Service and collected revenue for his Sovereign. They retained their own irregular horse and foot soldiers and war elephants, and kept up all the pomp and circumstance of barbarian lordship. These Chiefs were often at variance with each other, and some even quarelled with their own Maharaja. Under such a system of Government the condition of the common people can be better imagined than described. It was bad enough to be plundered and looted by their own Poligar and his high-handed soldiers, but there was always the danger of a neighbouring Poligar pouncing down on a smiling village and carrying away its ripened crops and its cattle and often its women folk. The ryot had to be both soldier and citizen and lived with the plough in one hand and a sword or spear in the other. It made a hardy and warlike race, but bred a sort of disregard for other people's property and there was continual turmoil in the land, often

might was right and very few could call anything their own. The heel of the oppressor pressed very hard on the common people in various forms.

3. Under such a system it will be understood how a brave but unscrupulous man like Hyder Ally rose from a common soldier to be the Sultan of the whole of the Mysore Province. Mysore was a bear garden and Hyder rose to be Chief keeper. His son Tippoo Sultan was too busy with foreign conquests outside the limits of the Mysore Province to introduce anything like a settled and enlightened administration within it and so Poligars throve, though many were at times immured in the dungeons of Seringapatam.

4. When the British conquered the Mysore Province and made an end of the Muhammadan usurpation, Colonel Wellesley (afterwards the Duke of Wellington), the first British Resident, opened out the gates of the dungeons of Seringapatam and gave freedom to the imprisoned Poligars. It was very easy to restore the old Hindu Maharaja to his ancient throne in Mysore; but it was not so easy a matter to keep him there. The turbulent Poligars had to be subdued and brought into some order. It is said that one of these smart gentlemen raised the standard of rebellion and gave trouble for about two years before he was finally broken.

5. To keep the Maharaja on his throne and to gradually introduce an enlightened and settled Government into Mysore a permanent British force was necessary. What is now known as the Civil and Military Station of Bangalore was then assigned by the Maharaja for the purpose. It was to be under direct English Administration and soon became a large English settlement but primarily Military. From it Military expeditions were sent out as required to all places in South India and returned to Bangalore after accomplishing their objects.

6. In ancient Indian warfare the camp follower was a very prominent feature. For one combatant, there were

often half a dozen followers. There were no railways, not even roads in those days, so that all the impedimenta of an army had to be carried by men and women and on oxen, even the Commissariat had to be carried; so that the numerous but necessary camp followers had to be located and controlled to be ready at hand immediately a Military expedition was required. The old Pindari and the Maharatta horsemen on their fleet ponies understood the value of a rear guard action and often tried to cut away the long stream of camp follower from the main combatant body ; thus even to be a camp follower required a sort of Military spirit and the ordinary cooly did not make a good one. In locating the Military in the assigned tract the camp followers had therefore to be considered and places assigned to them. Thus "*Pilka Cherry*" was the place granted for the grass cutters and syces. "*Bamboo Cherry*" the place where the stockade and facine makers were located; for these things were in great use in ancient warfare. "*Chupper Cherry*" where the mat makers were settled, etc., thus each class of camp follower was granted a separate location in the Station and this formed the foundation of the present Indian section of the town of Bangalore, it is this section which has become so congested and was the principal seat of the plague.

7. When first laid out everything was doubtless done very nicely. But camp followers like other classes of native servants have their cousins and their aunts and other numerous hangers on. In India, families also increase very rapidly, and hut was added to hut, mud hovel to hovel, till what were at first well laid out localities soon became dangerously congested and insanitary, and plague slew its victims here by the hundred and the thousand. As already stated the wail of sorrow that came from the descendants of the ancient servitors of the British Government was dreadful; and all through a preventible disease, in a comparatively modern town direct-

ly under British Administration, where a better condition of things would be expected.

8. A census of the congestion in these different Indian localities of Bangalore was made and was found to vary from about 250 to 300 persons per acre. The next question was how to remove the congestion in the cheapest and most effective manner; for till this is done the public health of Bangalore will always be unsatisfactory. The English soldier cannot be always tied down to Barracks. He will have to walk about sometimes and often this takes him into the native portions of the town. Also the Indian servants to the English people live in these parts and carry contagion with them into the English homes of Bangalore. It was seen that no scheme for the permanent improvement of the health of Bangalore could be successful without giving the Indian sections of the town some consideration. The English were more or less well looked after; and at worst are capable of taking care of themselves. It was the native portion of the town that should form the base of any large scheme of sanitary improvement; so it was decided to erect three new extensions of the town solely for natives and to open out the existing congested Indian localities.

9. How the first of three extensions was carried out has been already explained. It may be interesting to know how the opening out of a small portion of the Indian sections of the congested town was effected. A frequent method by which this is done in other places is to widen out the principal streets and to acquire and to demolish the houses on the sides thereof. These sites on the widened roads are sold at a profit and new palatial residential and business buildings erected thereon. For an example; an old street say about 25 feet broad is converted into a wide boulevarde about 100 feet wide; and for about a hundred feet on each side of the same the old houses are acquired and demolished and these sites, the value of which has been greatly enhanced by the

widened street, are sold at a profit and new palatial buildings erected thereon. The widened boulevarde lets in a strong current of air which sweeps through it, for spectacular effect such an improvement is very impressive. But to step out of the wide boulevarde into the side streets is more often than not to step into a closely congested native bustee, or other very objectionable congestion, where the lower order of the native population reside and sicken and die in all their primitive insanitation.

10. To avoid this, and to touch the sore at its worst point, the Collector Mr. Harris and the British Resident Colonel The Honorable Sir Donald Robertson were taken on to the tops of the highest houses from whence they could get a sort of bird's-eye view of the places below ; then it was found that the congestion was worst well behind the principal streets. The mud hovels were here packed so closely together that it was almost like a rabbit warren, the entrances to these hovels were in all kinds of little turns. It was apparent that any scheme of Sanitary improvement should give first attention to these portions of the Indian congested areas. Light and air were shut out and fermenting damp and stagnation all about. They were not fit places for stabling horses or even for housing pigs, and yet men and women and little children were making their habitation here. In the scheme for the Sanitary improvement of the Indian portions of Bangalore, provision was first made for the removal of the worst hovels in the most congested portions. This immediately let light and air into the surrounding huts where they were most wanted.

11. On one occasion, the Honorable Mr. Stewart Fraser was taken over the mud roofs of these hovels and was able to walk for some distance in any direction over the roofs, so closely were they packed together. In this instance all the mud huts in the place were removed and an interior open square formed and connected with the

main road. On the three sides of this open space small bazaars were erected, thus relieving the public roads of this nuisance. It is believed that these two methods will give the maximum degree of sanitary improvement in the places where it is most required and at a minimum cost. They give no spectacular impressive effect as a widened boulevarde would do; but the common people obtain the best advantage in the way of light and air therefrom.

12. The modus operandi is as follows:—Decide on a section of the congested area to be improved and make an enlarged plan thereof showing every house and hovel. The good well built house to be coloured in lake, the tiled ones light red, and the mud hovels in amber. This enlarged plan shows both the portions where there is the most congestion, and the quality of the houses forming it. Pick out the worst houses in the most congested places, and try to arrange so that they may be connected with each other and form little open spaces letting in light and air into these places. Make a tracing of the first plan showing the houses to be removed in black. This will at a glance show the proportion of the area to be removed with the area left untouched. The removal of about one-third of the population in the congested section was the standard proposed, this plan will show the proportion and effect of the removals and opening out proposed. Another tracing may then be made showing the full effect of the completed work. How the new open spaces should be connected with each other and with the nearest roads, drains formed, and new lamp posts and water taps fixed. The full effect of the improvement in letting in light and air will be seen in the last plan. There will be nothing spectacular in all this but the maximum of good will be done to the people at a minimum cost.

13. The next thing to be done will be to bring out an estimate of cost of the improvement. A tabulated statement is prepared showing the number and name of the

houses, their area, and their rent, the Municipal assessment which is based on rental, and the amount of twenty years rental plus 15 per cent for compulsory acquisition. This will give the maximum legal amount to be paid as compensation for each house to be removed. By forming panchayats of the leading people in a locality to arrange the purchase, houses could often be bought with the owners' consent at much below this amount. These mud huts cost very little to build and were rented at a rate quite disproportionate to their cost. Taking this into consideration the panchayats were able to arrange with the people to sell their houses at much less than the twenty years rental. For the two years that this operation was in progress in no one case did the people appeal against the compensation paid them but were cheerful and happy over it showing the advantage of working with people through panchayats of their own leaders. A saving of fully 25 per cent was made in the compensation paid by adopting this method of working, and best of all, the people most affected were happy and contented. The Government owes some gratitude to these unpaid panchayats for their gratuitous help in this matter ; and it is regretted that their names were not recorded and brought prominently to notice.

14. All the methods here explained are more or less original and have been most effective. There was mutual good feeling and trust between the people and the executive, and when this is the case the most disagreeable but necessary work can be got through without any friction whatsoever. It emphasised the good nature of the Hindu and Muhammadan common people when wisely handled. Though the forcible acquisition and demolition of houses is a disagreeable work and was done very economically ; yet the people affected, and the executive carrying out the work, became the greatest friends and their intercourse was always very agreeable.

15. It ought to be mentioned that the worst and most congested parts of the native town were done first.

Colonel The Honorable Sir Hugh Daly, the Resident in Mysore, and Surgeon-General Sir Pardy Lukes, Director-General, Indian Medical Department, when touring in Bangalore were taken through the parts of the native town which it was next proposed to open out; the method by which this was to be done was explained on the spot and the congestion viewed from some of the higher houses; detailed plans were also shown and the gentlemen agreed with this original method of removing congestion and of sanitary improvement for the native portion of the town. Through the wisdom of the old founders of Bangalore there is no congestion in the English section of the town. The most crowded parts thereof have not got a population of more than about forty persons per acre. The average is less than about ten persons per acre so that, when plague is completely effaced, Bangalore with its splendid temperate climate and cheap living will continue to be pre-eminently the settling place for the English from all parts of India.

16. The method of going behind the streets amongst the crowded hovels and removing the worst huts there and letting in light and air where it is most required as already stated affords most relief where it is principally required; but on the other hand does not lend itself to any spectacular effect, as wide boulevardes flanked with new handsome buildings do. In some cases where funds are available, and it is profitable to do so, both systems may be combined; but in a non-commercial place like Bangalore the system adopted appeared to be the most suitable.

17. Before passing away from this subject a word of commendation must be given to the Hindus and the Muhammadans from whom houses had to be acquired. Dealt with wisely through their own leaders, people whom they trust and respect, they showed themselves to be most tractable, not obstructive in any way, but hearty and helpful whenever called upon to assist. If rubbed up the wrong way or if brought under the influence of unscrupu-

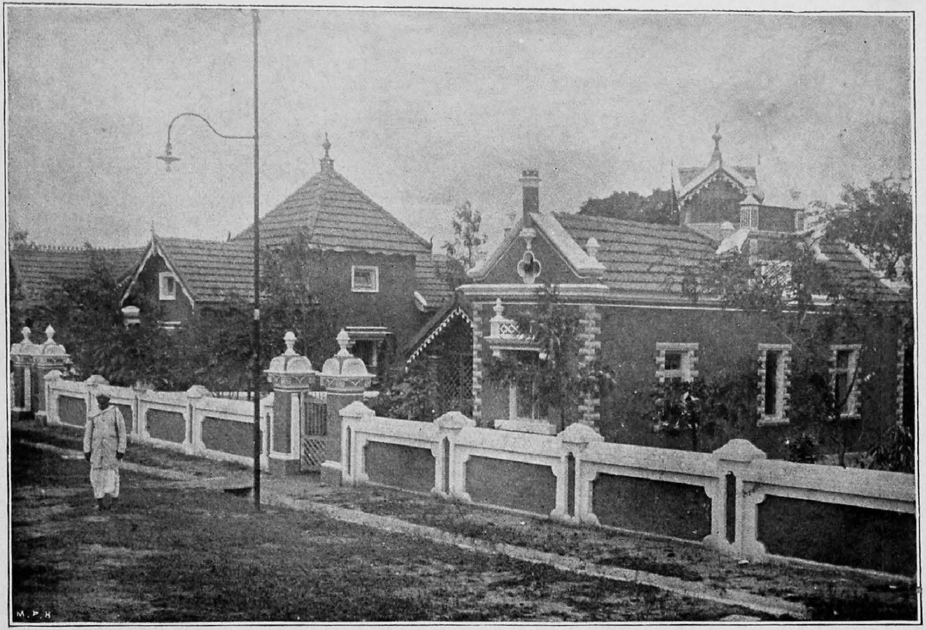
lous leaders what a lot of trouble and how much hindrance these same people could have given. And what is true of Bangalore may be considered to apply to all India. If there is trouble anywhere it is not due to the people but to some bad leaders. Just now in the bazaars one hears of all kinds of ridiculous war rumours. There are some foolish or designing leaders deceiving the people. It will be wise to stop this and the best way to do so will be through panchayats of reliable leaders of the people. Not necessarily English-speaking Indians, for often those who do not know English have the most influence with the people. Successful traders of all descriptions who may not know a word of English have often more influence on the common people than those who are well versed in the English language and read the English papers.

18. While glancing at this subject one more thought presents itself. In referring to the hard drinking habit of some of the early settlers of America, it was shown how the womanhood and the motherhood of that fair land rose up in their inspired strength and declared that this vile barbarism of ancient Europe must cease in America ; they succeeded in making it a comparatively temperate land. As one reads of the terrible slaughter now taking place in Europe by which the strong young manhood of nearly all its nations are being sacrificed at the gory altars of a few misguided and ambitious men, one wonders what the strong womanhood of Europe is going to do. It may be very exciting for the men to go and fight and be killed ; but what about the widows and the orphans and the desolated homes they are leaving behind. However kindly the State may be, nothing can fill up the void caused by those that are gone. Cannot the strong and enlightened womanhood of Europe and of all the world rise up in the majesty of suffering and of sorrow and declare that all wars must cease ? Can they not form themselves into one great federation, without reference to nationality, for the protection of their common manhood ? The position

of the women in the world is daily growing stronger. They are also naturally more vigilant than men. And their vigilance committees should be able to at once detect any schemes by individuals or by nations which may ultimately lead to war, and to nip them in the bud. They are now very patriotically sending their men to the wars with the greatest self-sacrifice, can they not with equal resolution organise to banish all wars from the face of this fair world? With systematic organising and planning and some little self-denial, and with God's help, this can be done. Even our blessed Master would not feed the five thousand without the aid of the five loaves and the two small fishes from His disciple and so, with the aid of the devoted and organised womanhood of the world, He can perform this greater miracle, the banishment of all war from the face of His own creation. This is a digression, but the appalling slaughter now taking place in Europe, and the heart-breaking and desolation it is causing, call aloud to a God of love that wars may cease and the answer comes back " Give me the organised devotion of the women as the disciples of old gave Me their five loaves and two small fishes, and I will make all wars to cease." The God of the Christian delights in working wonders through weak instruments, and if the organised devotion of the womanhood of the world will put itself into God's hands, He will say to the present gruesome conflict " Peace be still" and this peace will continue.

19. Now to go back to the congested parts of Bangalore, after the removal of the worst huts and hovels and the letting in of Heaven's bright light and fresh air into the places where they were most required. The owners of the houses that remained were asked to improve them with stone floors and better ventilation and Mangalore tiled roofs and a great number willingly responded. The constant unceasing ventilating effect of a Mangalore tiled roof has been already explained. The wind passes freely through its open joints, and there is no stuffiness in a

room thus covered. With the improvement effected by the Government, and the alterations made by the people themselves, the sanitary conditions of the Indian portions of Bangalore are being greatly changed and also those portions are made somewhat plague-proof.



FRASER TOWN
Near View of Two Completed Cottages.

SECTION IX

Historic. Praise Due to Capitalists for Building so largely in a New Locality and on New Rules

Some have remarked and asked why most of the houses in Fraser Town have been erected by rich capitalists; and why was not the poor man induced to build his own house to live in? It may be stated that every possible effort was made, and many concessions granted, to induce the poorer class of Hindus and Muhammadans to do this.

2. To avoid their going to sowcars for help, Government loans on easy terms were offered to them; but very few took advantage of this. When part of the congested old town was being demolished and compensation paid to them, Mr. Moore, the Collector, gave the owners of those demolished houses sites in Fraser Town expecting that the compensation money would be re-invested in buildings in that place. But it was not so. Most of those men allowed the sites granted to them to lapse to the Government rather than build there.

3. It must be recollected that Fraser Town at first was only raggi fields and the poorer man, with just enough money to build his own house, probably did not care to risk his little all in building in such a place; so people who desired to build their own houses avoided Fraser Town. If one had waited for them to change their minds the place would probably still be raggi fields.

4. To induce even capitalists to build there, the lead had to be given by an Englishman, Mr. Lindley, a retired railway foreman. After he gave the start others, Hindus and Muhammadans, rapidly followed. One cannot praise

too highly the spirit evinced by these gentlemen. They literally poured out their wealth on an undertaking the results of which were at that time uncertain. Very few could then have stated that Fraser Town would be a financial success.

5. There were many things against it. It was intended primarily for natives and they as a rule are averse to living away from the bazaars and centres of life and business in which they are all more or less interested. It was on the way to, and not far from the Hindu cemetery and Hindus are superstitious, they said that to live there would be to go half way on the road to the cemetery, that is on the road to death. The filth depot was then not far from the site of the new town and the odours from this filthy spot used to blow right over it. The depot was abolished only after the town was built.

6. Under such adverse conditions but yet seeing that the Resident in Mysore, the Hon'ble Mr. Stuart Fraser, was very much interested in this scheme and that Mr. Moore, the Collector, encouraged it as being the only means by which the congested areas could be relieved and the poor people there helped, they came forward, and spent small fortunes in constructing new buildings on raggi fields with very little hope of adequate financial results.

7. The rules by which it was hoped to make the place plague-proof were also strenuously carried out, and these were all new and untried and quite different to the usual manner of building, yet this did not discourage them. They built loyally and rapidly according to these new peculiar rules. Where basements 1½ feet high were demanded, Mr. Annaswami Mudaliar made his little houses with basements 3 feet high ; showing how eagerly they wished that this new experiment should succeed. It all meant money and they did not spare this ; sufficient that the poor could be helped and the plague defeated. Such kindly disinterested and enlightened action is not often seen for none of these men are millionaires. All of

them are hard-working and making their living by the sweat of their brows. They did not give from their abundance, but from comparatively limited means, and with small probability of an adequate return; yet they have built what, *in the words of The Honorable Sir Harcourt Butler, at the first all India Sanitary Conference, "Is the only plague-proof town in all India,"* and what is equally great, they inaugurated a practical social reform in teaching the poorer classes of Hindus and Muhammadans a new and better method of living which will affect the life and health of the whole nation if followed everywhere.

8. It is respectfully suggested that a stone obelisk be erected at the crossing of the two principal roads with their names inscribed thereon—Mr. Lindley, Rao Bahadur Mr. Annaswamy Mudaliar, C.I.E., the Honorable Khan Bahadur Hajee Ismail Sait, Mr. Rutna Singh, Rao Bahadur Mr. Maigandadeva Mudaliar, Mr. Kumaraswami Naidu, and some others, so that coming generations may know the names of the men who erected this model little native town for the imitation of all India. In this it has not been talk but downright cash spending and very hard work. Many of them neglected their other important money earning business and could be seen, late in the day, supervising these neat little cottages.

9. Mr. Rutna Singh did more. He managed to induce a large number of the artizan class to occupy his buildings, Gold and Silversmiths, until it looked as if his part of the town were going to become a small native industrial centre. All these families from the worst part of the congested areas were living apart in neat little cottages with small gardens around each, a new feature in Indian life, bringing health and happiness, social reform and uplifting with it.

10. At the risk of being tedious it may be necessary to revert again to the part played by the rat in the plague. There is no doubt about the plague being primarily a rat disease, in very much the same way as enteric is princi-

pally a disease that fresh young Englishmen nnd Englishwomen are specially subject to. But would it be concluded from this that they are the cause of enteric, they are only the victims.

11. The cause is behind them, and is being overcome by Government dairies, and greater care in the conservancy of the native dairies and in all dairy productions, and this is mitigating enteric. So also with the plague and the rat. The rat is not the cause; it is merely the first victim.

12. The real cause of the plague is behind the rat and should be discovered and destroyed. An attempt has been made in constructing Fraser Town to do this and to practically overcome the first cause of plague in Bangalore. The result so far, after a trial of about seven years, has been encouraging. Before condemning what has been advanced let further experiments be made. Enough has been stated to show that there is a wide field for more minute investigations; beginning with mother earth herself and extending right up to the tree tops; from the bottom burrow of the rat hole to the top-most waving branches of the huge Indian Ficus tree. The plague just now is master in all this realm and he has no right there. He is an intruder and all who care for India and its dumb millions should endeavour to expel him. It will be interesting to know how many people have up to date died of the plague in India and how much has been expended on plague prevention.

13. It ought to be here mentioned that the executive who had the laying out and the supervision of the construction of Fraser Town on the new lines already described treated these philanthropic builders with the greatest sympathy and consideration. They admired their spirit and felt it to be their duty and privilege to give them all possible help. This was shown in many little ways.

14. When the roads were countersunk according to rule one, huge heaps of soil were laid out on each side of the roads. Fairly good bricks could be made from this

earth. The builders were advised and shown how to do this, with the result that bricks could be made on the spot about 40 per cent cheaper than if purchased at the usual brick yards. The raggi fields, during the first year or two, gave place to smoking brick fields and these again to elegant cottages as can be now seen.

15. The designing of these cottages and the passing of the buildings gave room for further help, so that all around the kindly builders and the sympathetic executive tried by every means possible to help each other, and to make the little town the real success it has now become.

16. In the last economic conference at Mysore the surprising statement was made that dairy produce to the value of four millions of rupees was imported into that Province in one year 1913. The table-land of Mysore, with its malnad or low mountain ranges, is specially adapted for the raising of good cattle. The Government Military Transport bulls, used by the British Government, were obtained from Mysore. It has the reputation of producing the finest fleet trotting cattle; and yet its cows and dairy productions are apparently so neglected as to require such large importations. It will be interesting to know how it is in other parts of India. The newest methods in the raising and improving of milch cattle, are apparently not yet known in India. It has been already stated that even a place like Java, under Dutch jurisdiction, is importing largely into India; so are the enterprising Japanese. Other countries are becoming wealthy at the expense of India which is governed by one of the most enlightened of nations and yet is so dreadfully backward in all that can make a people rich, so antiquated in the methods on which the resources of its life depend. The development of the land has not advanced since the British occupation.

17. The previous Hindu and Muhammadan Governments had made that wonderful system of artificial tanks or reservoirs on which the agricultural prosperity of South

India depends. It is said that the length of these artificial embankments can girdle the earth. All these are mighty things to have accomplished. In one very large reservoir in South India there is an inscription of the sun, moon and stars indicating that the Hindu who built it had made it so substantial that it would continue so long as creation existed. These remarkable systems of tanks in South India have made it the great rice producing country it now is, and added considerably to the wealth of the agricultural people who form $\frac{9}{10}$ of the population. What has England done in comparison for these people? Very little indeed. If in its schools it can only keep them abreast with improvements made in other parts of the world it will do them a real good. The country is naturally a very rich one. It has a teaming and industrious population, with few wants, and a cheap manner of living. If this population is wakened up it can supply half the world and the land become very rich indeed.

18. A young man was educated to be an Engineer and started life as such; but the rough life of an Engineer was too much for him so he gave it up and went into business in a European firm. The kindly merchants did not demand a high academical training from him, but they desired that he should know their business well and took a little trouble in teaching him, with the result that his income gradually rose to something like Rs. 15,000 a month which he would never have got as an Engineer.

19. The poverty of India is due to its undeveloped economic conditions; its natural products are kept very scanty indeed and every country in the world is seizing on this and making it their dumping ground. Asia and Europe are being enriched by India, but India itself is being kept poor. When its economic conditions are improved it will become rich and wealthy. With its industrious and frugal manner of living and no compulsory Military service, it ought to be, and with God's help will

be, one of the richest countries of the world; and it will then begin to realise the true value of British Administration.

20. This reference to the economic conditions of India is made because there is an irrepressible desire to seize this opportunity to say some little thing towards the good of a very interesting and loveable people whose welfare is the first object of the British Government; and also because an improvement in economic conditions will lead to improvements in the sanitary conditions of the people and will mean the removal of the causes of the plague and the great sorrow it has brought to the common people.

21. As a result of the sanitary rules on which Fraser Town has been laid out and built and its exceptionally fine position, as already stated, it has become a sort of health resort and sick people from distant places have been drawn to it with the best results. They have expressed astonishment at the neat comfortable little cottages and at the very cheap rents. They have stated that nothing like it can be found in all India. Without intending it Fraser Town has also become the poor whites' paradise. The better-to-do white is building in ¼ acre plots on higher ground across the railway, but the poorer one is finding Fraser Town a delight. For the small rent of Rs. 3 per month a neat little cottage (three roomed) with a small garden around it can be hired, and though amongst Indians, the little open area around it in a manner isolates the little house and does not make it so objectionable as living in other native localities.

22. A soldier's widow on a small pension took one of these cottages and showed her friends around the place with great joy; spotlessly clean with white curtains at doors and windows it did look nice and comfortable. Thus the poor, both black and white, can live in peace and quietness in Fraser Town, "Not being afraid of the terror by night or the arrow that flieth by noonday,

nor for the pestilence that walketh in darkness, nor for the destruction that wasteth by noonday. There no evil shall befall them, neither shall any plague come nigh their dwelling." A sort of health Arcadia!

23. But it will require Argus-eyed angels of vigilance to always keep it thus. It wanted some effort and firmness to persuade some of the builders to observe the plague-proof rules; and especially to keep the buildings within one-third the area of the site plot. It was a new departure, and different to all their old ideas of things, and most people did not understand it, some people probably do not understand it yet especially why only $\frac{1}{3}$ of their own land should be built on. Official life in India is so changeful and new comers cannot always see with the eyes of those who have waded through the dreaded terrors of the plague and tried to learn its secrets at the very gates of the enemy; thus one is sometimes despondent of the future.

24. Hence the reason for this publication, that the necessity of each rule may be fully understood and the rule observed with very great care.

25. After the first severe outbursts of plague a scheme was prepared for opening out the congested areas of the town and making three new extensions for the evicted people on the north, east, and south-east portions of the town at a cost of Rs. 17 lakhs. The Corporation approved of this project. Colonel Branfoot, afterward Sir Arthur Branfoot of the Secretary of State's Department, went through it in detail. He was then the Principal Medical Officer to the General Commanding the Station and obtained the General's hearty approval to the scheme. Thus supported, Sir Donald Robertson, the then Resident in Mysore, submitted it to the Government of India and urged its early sanction. But the Government of India were apparently staggered at the great cost of the project.

26. After much correspondence a small part of the scheme as a trial was submitted when that good officer the late Sir James Bourdillon was Resident. This

comprised the opening out of a small section of Blackpally and the constructing of what is now known as Fraser Town for the evicted people.

27. The Hon'ble Mr. Stuart Fraser was so good as to allow this small town to be built on the original lines and rules already explained by which it was made a plague-proof town. Through the kindly continual personal inspection of Mr. Fraser and Mr. Moore the Collector, the builders were encouraged to erect the pretty little cottages peculiar to this town.

28. After about four hundred cottages were completed at the earnest request of the builders thereof, Mr. Fraser was so good as to allow the town to bear his own name. Many others, official and non-official, took a great deal of interest in the place and helped at the beginning to popularize it to both builders and to residents. It is now very popular and has turned out a great financial success. The builders can sell their cottages at a profit of a hundred per cent. They deserve this for they risked a great deal at the beginning. The town has also become a model and other parts of India have asked for its plans. To slavishly copy it may not be correct for there are such things as various soils, slopes, and other natural conditions of the land to be considered.

29. But there is no reason why every Indian town, and even larger village, should not have something like it; and the bulk of India's population introduced to a new and more sanitary manner of living. It will tell principally in the good of the children; and the coming generation will reap its advantages and acknowledge it as a real Social Reform which was only possible in the peace and security afforded by the firm and just British Administration. It is not necessary now to huddle together for mutual protection. Each family can live under its own vine and fig tree and feel safe from all the violence and plundering of the past.

30. It must not be concluded from anything stated

that the writer avers against the British occupation of India. On the contrary, no greater good could have happened to the country. But it is only Divinity that cannot make mistakes; and whatever errors have been made were the results of the very best intentions. Dark and downtrodden India, which had writhed for centuries under the heel of the oppressor has been emancipated; its feeble knees are being gradually strengthened so that it may walk and leap in the joy of the new life flowing now into it. England can truly say in the words of the old inspired prophet. "He hath sent me to bind up the broken-hearted, to proclaim liberty to the captives, and the opening of the prison to them that are bound; to give unto them beauty for ashes, the oil of joy for mourning. And they shall build the old wastes, they shall raise up the former desolations, and they shall repair the waste cities, the desolations of many generations." "For your shame ye shall have double; and for confusion they shall rejoice in their portion; therefore in their land they shall possess the double; everlasting joy shall be unto them."

31. Is not this great morning of promise already breaking? Is not a new sun already rising on India? When the orbit is run, the meridian glory will surely come. Let those who would unwisely haste matters be careful. The pace may appear slow, but it is sure, and a false step may result in a great set back and India cannot risk this. After three centuries of benevolent Roman occupation, some of the ancient Britons considered that they were capable of ruling their own land—educated in Rome some talking the Roman language, dressed in the Roman toga in the place of their old tunic, and with their hair trimmed in the Roman fashion, some presumed to think that they were all sufficient. But when the last Roman legion left and the pirate ships of Saxons arrived how sad was their fate! God grant that History will not repeat itself in India. Under the aegis of the wise British administration India has already grown wonder-

fully. With continuous internal peace and making the most of her vast resources, in quietness and confidence, she will develop a hundredfold in the future. A result of these improvements will be the disappearance of pestilence and plague and famine, when her population will also go up in mighty bounds, and German Africa will be given to her as a Colony. Who will be so bold as to predict the final result? A highway is being opened out for the Princes of the East, when the Indian Princes will take their rightful places in the Great Parliament of the nations of all the earth. After all England is only an humble instrument in the hands of a Loving Mediator who is raising India from darkness to light to present it a great redeemed and glorified nation into the hands of His Almighty Father.

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METHODIST PUBLISHING HOUSE, MADRAS.

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